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QUANTITATIVE ANALYSIS OF HIGH-QUALITY OFFICER SELECTION BY COMMANDANT'S CAREER-LEVEL EDUCATION BOARD

by

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As the Marine Corps seeks to recruit and retain high-quality individuals, the term "quality" must be defined in order to meet current and future manpower needs. In our research, we identify characteristics and attributes valued by the Marine Corps when selecting high-quality company-grade officers. Selection on Commandant's Career-Level Education Board (CCLEB) serves as a proxy for high quality.

Our research finds that factors relating to job experience and job performance are valued more highly than variables associated with training or early career attributes of Marines during the CCLEB selection process.

The board places substantial emphasis on job performance, as measured by fitness report value, when selecting Marines for CCLEB. This finding is in line with the intent and goal of the Fitness Report (FITREP) system of identifying high-quality personnel. Seniority, as measured by years of commissioned service, also appears to be a strong predictor of selection outcome. The presence of an updated photograph in a Marine's Official Military Personnel File (OMPF), which can be interpreted as a signal of motivation or ability to follow instructions, shows a significant effect on selection. In addition, our results show The Basic School (TBS) scores, specifically the academic and leadership portions, are an accurate earlier predictor of both performance and selection. The findings in this study provide support in the effort of identifying and measuring the quality of Marine Corps officers.

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QUANTITATIVE ANALYSIS OF HIGH-QUALITY OFFICER SELECTION BY COMMANDANT'S CAREER-LEVEL EDUCATION BOARD

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LIST OF ACRONYMS AND ABBREVIATIONS

ADP	Advanced Degree Program
CCLEB	Commandant's Career-Level Education Board
CD	Career Designation
CFT	Combat Fitness Test
CNA	Center for Naval Analyses
CPIB	Commandant's Professional Intermediate-Level Education Board
DOD	Department of Defense
EWS	Expeditionary Warfare School
FITREP	Fitness Report
FY	Fiscal Year
GCT	General Classification Test
M&RA	Manpower & Reserve Affairs
MARADMIN	Marine Administrative Message
MCCDC	Marine Corps Combat Development Command
MECEP	Marine Corps Enlisted Commissioning Educational Program
MMOA	Manpower Management Officer Assignments
MMRP	Manpower Management Records and Performance
MOS	Military Occupational Specialty
NROTC	Naval Reserve Officers Training Corps
OCC	Officer Candidate Course
OccFld	Occupational Field
PFT	Physical Fitness Test
PLC	Platoon Leaders Class
PME	Professional Military Education
RO	Reporting Officer
ROCV	Reporting Officer Cumulative Value
RS	Reporting Senior
RSCV	Reporting Senior Cumulative Value
SEP	Special Education Program
TBS	The Basic School
TFDW	Total Force Data Warehouse
USMC	United States Marine Corps

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I would first like to thank the Lord for His blessings and the amazing people He placed in my life, especially my family. My wife, Emily, provides me with unwavering support and patience in all I do. Her resilience as a Marine spouse, unending love as a remarkable mom, and selfless sacrifice as a wife are both humbling and inspiring. Our kids are true blessings; Norah gives us never-ending joy and love, and Oliver provides us with endless happiness and laughter.

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I. INTRODUCTION

> Overall, we are and will remain a U.S. Marine Corps comprised of the highest quality Americans who are collectively committed to the mission and who are well-led, trained, and equipped… and when called upon to fight, we win—always.
>
> —General Robert B. Neller (2017, p. 3)
> Commandant of the Marine Corps

In order to remain a service full of "the highest quality Americans," Marine Corps leadership must possess an inherent understanding and definition of the term "quality" (Neller, 2017, p. 3). Upon taking command, the Commandant of the Marine Corps, General Robert B. Neller, stated that "maintaining and improving the high-quality people that make up today's Corps" is one of his three guiding tenets (Neller, 2016). Themes focusing on "high quality" personnel continue to surface across the Marine Corps in the guidance and directives surrounding talent management, showing that senior leaders need to determine what characteristics define a high-quality Marine. In order to meet the current and future manpower needs of the Marine Corps, recruitment of quality candidates and retention of high-quality Marines must be intentionally focused upon, and requires a clear definition of "quality."

Quality can involve both tangible and intangible skills, quantitative and non-quantitative attributes, and observable and non-observable characteristics. Senior leaders can identify high-quality personnel based on the leader's individual experiences, but the views and criteria in determining quality may differ from leader to leader depending on their unique experiences. There are no time-tested templates that the Marine Corps can universally implement across every training pipeline and occupational field to automatically screen for quality.

By researching and defining what the term "high quality" means, the Marine Corps can improve efficiencies in recruitment, retention, promotion, and educational investments. There may be universal characteristics that define high quality, or it may take on different characteristics within each field. Not only is recruitment of high-quality

individuals vital to staffing the Marine Corps, but further development and retention of these individuals is also vital. The Marine Corps is an internal labor market due the incoming flow of new personnel from the bottom and having to promote and fill all higher echelon billets from internal sources (Rosen, 1992, p. 227). Therefore, defining quality is essential to successfully manage the development and promotions of high-quality Marines.

A. PURPOSE

Multiple studies have examined high-quality Marine Corps officers by using proxies such as selection to Career Designation (CD), selection for promotion, and The Basic School (TBS) performance, but our study utilizes selection for an advanced educational opportunity as the measure of quality. The Commandant's Career-Level Education Board (CCLEB) aims to select the "best and fully qualified"; therefore, by examining Marines selected over the timespan of three years, this research shows what attributes and characteristics leaders most associate with quality (United States Marine Corps [USMC], 2015). With the selection results of these boards, we seek to understand the process and details of what separates those Marines selected from those not selected. The board members of CCLEB are senior leaders who leverage their experience and judgement to brief and select company-grade Marine officers. These board members are essentially providing us a measure of what the Marine Corps currently values in their junior officer corps. We chose CCLEB as a proxy for quality based on the increased competitive nature of the board when compared to CD and junior officer promotions.

B. RESEARCH QUESTIONS

The research questions shape our analytical models and focus our scope.

1. Primary

- What characteristics and attributes indicate selection of high-quality company-grade officers?

2. Secondary

- Does the Marine Corps place differing levels of importance on characteristics and attributes for different aggregated occupational fields?
- How important is an up-to-date photograph in selection on CCLEB?

C. SCOPE

In order to focus the scope, we concentrate our study on CCLEB. By specifically examining CCLEB, we focus on Active Duty company-grade officers and utilize the Fiscal Year (FY) 2014 to FY 2016 boards. We choose not to include the Commandant's Professional Intermediate-Level Education Board (CPIB), because including CPIB may result in non-random independent variables due to self-selection bias, as Marine officers have the opportunity to self-select out of the Marine Corps prior to CPIB evaluation. By utilizing CCLEB data, we mitigate self-selection bias due to Marines being evaluated before the end of their initial service commitment.

Our research utilizes quantitative variables to analyze the selection of high-quality officers. We incorporate both binary and continuous data in order to leverage statistical analysis tools.

D. ORGANIZATION OF THE STUDY

We organize this research into six chapters. Chapter I provides the overview of the concept of quality and the purpose of the study, outlines the research questions to be addressed, and discusses the research scope. Chapter II explains the foundation framework of CCLEB. Chapter III provides a review of literature that examines Marine Corps officer quality, and covers relevant studies that utilize similar techniques and methodologies. Chapter IV describes the data collection, cleaning, statistics summaries, and initial analysis of the variables. Chapter V presents the models used to analyze the data and explains the results. Chapter VI provides the conclusions and recommendations of our study.

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II. COMMANDANT'S CAREER-LEVEL EDUCATION BOARD

This chapter provides an in-depth background of the Commandant's Career-Level Education Board (CCLEB), which aims to select high-quality officers. The chapter first discusses the history and development of the board, then details the actual proceedings, and, finally, explains recent changes and future developments of CCLEB.

A. HISTORY OF ADVANCED EDUCATIONAL OPPORTUNITIES FOR MARINE CORPS OFFICERS

The Marine Corps has long valued the importance of investing in their personnel through emphasis on training, experience, and education, while delicately balancing the related opportunity costs. According to Dr. Gary S. Becker, education and training are the most important types of investment in human capital as they focus on raising the future productivity of the recipient (1993, p. 17). The Marine Corps offers a variety of advanced educational opportunities to company-grade officers in order to increase the capabilities and knowledge of each Marine. These advanced educational opportunities range in length from a nine-month resident Professional Military Education (PME) school to a two-year postgraduate degree program and even three-year programs.

The Marine Corps incurs a cost for each educational assignment. There are obvious financial costs, such as relocation and institutional costs, but there are also opportunity costs, which are potential benefits given up in lieu of another assignment (Becker, 1993, p. 166). For the Marine Corps, these opportunity costs relate to removing an officer from the operational forces and their primary military occupational specialty (MOS) career path in pursuit of educational opportunities. Typically, assignment to an educational program occurring after a Marine's completion of his or her initial tour in the operational forces (Clelan, Kao, & Ladner, 2016). Marines evaluated after their first operational tour are first lieutenants or captains, even though variation exists between MOSs in the exact timing based on differing career paths (Clelan et al., 2016). Marine officers incur opportunity costs by exchanging a billet related to their primary MOS for the ability to pursue an advanced educational program.

Prior to 2011, individual Marine Corps company-grade officers applied for and self-selected into advanced educational programs. Each educational program had a separate application and selection process aimed to attract and select high-quality officers. With the announcement of Marine Administrative Message (MARADMIN) 488/ 11 in 2011, the Marine Corps consolidated and methodically organized these educational programs' application processes under a single non-volunteer board process. This chapter presents the origin and development of CCLEB. The Marine Corps now proactively chooses whom they invest in. These investments are now specifically directed at those selected as the "best and fully qualified" Marines as part of the CCLEB process (USMC, 2015). As a result, the Marine Corps has an enhanced ability to seek those Marines they hope will have a long-term impact on the organization and allocate resources to improve the human capital of this select group.

From 2011 onward, CCLEB revamped the application, screening, and selection process for numerous advanced education opportunities by unifying them under one all-inclusive program. CCLEB is a "comprehensive approach in a non-statutory competitive board process to select the best and fully qualified officers for career-level PME, graduate-level education, and select special duty assignments" (USMC, 2015, p. 1). In the late summer of each year, company-grade officers in the rank of first lieutenant and captain, who have an estimated departure date from their current assignment in the following year, up to 31 October, are screened by CCLEB (USMC, 2013). The board comparatively examines each Marine in order to select high-quality officers for these advanced education opportunities. After the selection process is complete, Manpower Management Officer Assignment (MMOA) staff slates Marines into specific educational assignments by balancing each Marine's desires, career timing, qualifications, and the needs of the Marine Corps, with MMOA distributing the final list in January (O. J. Lopes, personal communication, 30 November 2016).

B. FACTORS CONTRIBUTING TO CCLEB DEVELOPMENT

This section shows that the Marine Corps developed and implemented the CCLEB concept to decrease the negative stigma associated with educational assignments,

increase the quality of Marines sent to each program, and appropriately fill the staffing requirements for billets requiring a graduate degree. In 2002, a research team from Marine Corps Combat Development Command (MCCDC) addressed a widespread negative connotation surrounding graduate education programs (Wright, Thompson, & Blake, p. 3–31). The researchers attribute this negative perception to the idea that participating in one of the educational opportunities would decrease the likelihood of promotion and selection for command (Wright et al., 2002, pp. 3–30). A Center for Naval Analyses (CNA) study also finds similar negative perceptions showing Marine officers were concerned that selection to graduate education programs, such as Special Education Program (SEP) and Advanced Degree Program (ADP), would be detrimental to their career (Bowling, Stimpson, & Hiatt, 2008, p. 1). Marines viewed those who applied to one of the graduate education programs as not actively seeking career progression inside their MOS, and the Marine may be looking to obtain a postgraduate degree in preparation for retirement or separation from the Marine Corps (Bowling et al., 2008). Additionally, the supply of volunteers for educational programs, such as SEP and ADP, did not fill the number of required slots; therefore, supplemental boards were required to solicit the necessary number of Marines to fill advanced educational program slots (USMC, 2006).

Not only did SEP and ADP have issues with filling their slots, and filling them with high-quality individuals, but some personnel felt there were also quality issues at resident PME. A 2006 study done by Marine Corps University stated the need to "elevate the importance" of the Marine Corps' career-level PME course, Expeditionary Warfare School (EWS) (Wilhelm et al.). In 2010, the 35th Commandant of the Marine Corps, General James Amos, distributed his planning guidance that the Marine Corps will "better educate and train our Marines to succeed in distributed operations and increasingly complex environments" (p. 8). As a result of this specific objective, the Manpower and Reserve Affairs (M&RA) branch of Headquarters, Marine Corps developed CCLEB to consolidate all advanced educational opportunities under one entity.

CCLEB incorporated M&RA's solution to General Amos's objectives of tripling resident EWS throughput and performing a comprehensive overhaul of the SEP program

(USMC, 2012b). With the implementation of CCLEB, the Marine Corps demonstrated that it values EWS by hand selecting and sending the highest-quality officers available to attend the resident course. Introducing CCLEB gave the Marine Corps the ability to handpick individuals for each advanced educational opportunity instead of lacking quality control ability through a voluntary process. By selecting the "best and fully qualified" company-grade officers for these programs, there is potential to increase the rapport and change the current stigma. A recent CNA study summarized the driving factors of the CCLEB implementation:

> These new selection boards were designed to select top-performing officers from across the Marine Corps to send to the education programs, which would help remove the stigma that those who attended them were of lower quality, wanted to leave their PMOSs, or planned to leave the Corps. (Clelan et al., 2016)

Over time, the Marine Corps hopes to cultivate a positive perception and develop institutional incentives for these programs by focusing the educational investments into high-quality Marines, who are sought out for retention and leadership roles. Also, the study done on the USMC PME program stressed the importance of placing greater emphasis on PME in the career-growth of company-grade officers (Wilhelm et al., 2006). By allowing these high-quality officers to incur an absence from their primary MOS in the operational forces and sending them to an education program, the Marine Corps can show its support and emphasize the importance of these opportunities as investments into the human capital of the USMC officer corps.

C. EXECUTION OF CCLEB

Each fall, typically in August or September, a cadre of 21 Field Grade Officers meets in Quantico, Virginia, for three weeks as board members of CCLEB (USMC, 2014). The board reviews approximately 2,000 officer records in order to select the "best and fully qualified" individuals for advanced educational opportunities (USMC, 2015, p. 1). The pool of Marines consists of those company-grade officers executing permanent change of duty station in the following year. The pool sub-divides Marines based on MOS to comparatively gauge them against their peers and prevent the difficulty of

comparing individuals across different communities. For example, the board examines and votes on all CH-53E pilots before considering the next group of Marines.

Each Marine is assigned a briefer that examines the file, prepares the data, and briefs the entire board on the pertinent details of each Marine. Captain Oryan J. Lopes, who is in charge of Officer Programs at MMOA-3, states that briefers spend approximately 30 to 60 minutes preparing each file and condense the most important information into a three minute brief (personal communication, 30 November 2016). A brief typically begins with quantitatively describing a Marine's attributes based on such facts as physical fitness scores, experience, and performance indicators in order to create an overall first impression. Then the briefer validates this first impression by leveraging qualitative comments derived from the Marine's Fitness Reports (FITREP) (M. M. Manieri, personal communication, 1 December 2016). The 21 members of the board vote on each individual and the president of the board determines how many yes votes constitutes a selection (O. J. Lopes, personal communication, 30 November 2016).

D. CHANGES IN THE EXECUTION OF CCLEB

In the past, selected Marines were tiered and labeled as a "primary" or "alternate." Starting with the FY 2016 board, the use of the labels for primaries and alternates ceased. By eliminating these labels, the pool of candidates available for the slating process is increased. With a greater pool of Marines, MMOA can better fit programs to Marines and Marines to programs that require previous qualifications and education.

Based on lessons learned in the first few CCLEB rotations, the Marine Corps identified career timing as a critical element in the development of Marine Corps officers (Clelan et al., 2016). CNA similarly pointed out the significance of completing career milestones in their 2008 study (Bowling et al., p. 3). Also, the MCCDC study in 2002 validated this same concept as Marines need to remain competitive and qualified in their primary MOS (Wright et al.). The year after its establishment, on the selection list, CCLEB began to identify Marines whose career timing fit better into time intensive programs such as graduate level education (USMC, 2012a). The program coordinators at

MMOA have continued to ensure improvements are made and a Marine's career timing is a high-priority.

E. FUTURE OF CCLEB

For FY 2017 CCLEB, M&RA identified Marines with suitable career timing even prior to initial selection and not just post-selection. This shows that M&RA has seen the vital importance of the career-timing concept identified in the 2002 and 2008 reports. The newest changes to the CCLEB process began with the FY 2017 board, where the selection focus shifted from "best and fully qualified" to first identifying Marines who are qualified to fill advanced education opportunities and then selecting the best from that pool to fill the number of school seats (O. J. Lopes, personal communication, 30 November 2016). To summarize, the FY 2012 to FY 2016 boards selected the highest quality officers and then slated that pool of officers to fill educational opportunities, as opposed to the FY 2017 CCLEB that identified those individuals who are most qualified to fill an educational program slot and then selected the highest quality from that pool.

F. SUMMARY

This chapter describes the core reasons why the Marine Corps implemented CCLEB. M&RA sought to reduce negative stigmas surrounding ADP and SEP, improve quality of the students and education of Marine Corps PME, and to ensure all staffing requirements are filled. The actual board proceedings were described to give the reader greater insight into the execution of board. Finally, we explain the recent changes and future developments of the board. Chapter III examines studies with similar topics, methodologies, and analysis.

III. LITERATURE REVIEW

This chapter focuses on previous research that attempt to define the term "high-quality" and studies that provide contributing methodology strategies and knowledge to our research. We first examine former studies where researchers use a variety of methods to measure high quality among Marine Corps officers. In addition, we analyze studies that leverage similar variables to our research, or employ similar methodologies in their analysis.

A. QUALITY EMPLOYEES

An inherent degree of uncertainty and variation exists when defining what a "high-quality" employee looks like. In the non-military job market, business organizations constantly attempt to provide answers and define the characteristics of what identifies a high-quality employee. Media publications, such as *Forbes* and the *Houston Chronicle*, tend to use vague descriptors when attempting to describe how to identify a high-quality employee (Sundheim, 2013; Shaw, n.d.). Characteristics such as innovative, hardworking, successful, and consistent may all be valid descriptors, but are unable to provide a detailed and, most importantly, an actionable definition to positively impact policy and doctrine. The vagueness of these descriptors may be the result of the authors attempting to encompass too wide of a group when examining all "employees." As researchers narrow in on specific genre, characteristics and traits of talented and quality individuals can become more specific.

Regardless of the characteristics and traits an organization values, it is imperative for the individuals making these decisions to know which criteria they are emphasizing. In order to determine defining characteristics of high-quality employees, an organization must analyze a process, benchmark, or metric used in identifying high-quality individuals. When looking at the military genre, Rosen discusses that the characteristics emphasized through promotions and selections are those behaviors which are rewarded and therefore encouraged through the organization (1992, p. 230).

The Marine Corps has conducted numerous studies to analyze quality officers, which are distinguished based selection for advancement and retention. Typical benchmarks used are promotion to the rank of lieutenant colonel or selection on the Career Designation (CD) board. Promotion to lieutenant colonel occurring later in a Marine officer's career, after numerous peers have either self-selected or been forced out of the Marine Corps, which both adjust the competitive pool. CD occurs very early in company-grade officers career but is not as selective as CCLEB. Our research uniquely examines the CCLEB selection, which has yet to be researched. We leverage some of the methodologies and frameworks that previous Marine Corps officer quality studies utilize.

B. GARZA (2014)

The 2014 Marine Corps study by Garza examines the significant factors that affect a Marine Officer's chances of being career designated. Garza also produces a tool that Marines and their chain of command can utilize to determine the impacts of adjusting a single variable and how it would influence an individual's probability of selection on the CD board.

The research looks at 6,732 observations of Marine Corps officers considered for selection by the career designation boards from FY 2010 to FY 2013. Garza acquired data that appropriately reflects the data available to board members at the time of the board.

Garza uses a probit model with selection for career designation as the dependent variable. He utilizes five independent variable categories to develop a composite model: demographics, commissioning, MOS, performance, and experience. Specifically Garza focuses on each subcategory of Marines (i.e. Ground, Combat Service Support, Aviation-Ground, Aviation, Law) in order to show how variables would impact different aggregated occupational fields in differing magnitudes. Utilizing these five independent variable categories coupled with the different MOS categories lead to separate models where the change in marginal effects can be observed. Our research utilizes the same five MOS subcategories used by Garza.

Garza's results show that the Reporting Officer's Relative Value is the most significant variable of interest, combat deployments are not significant, and a higher performance on FITREPs increases an officer's likelihood of selection for CD. Other important findings relate to an increased likelihood of selection for prior enlisted Marines and some evidence supports higher Physical Fitness Test (PFT) & Combat Fitness Test (CFT) scores increasing probability of selection. Based on the high selection rate for aviators and lawyers by CD boards, Garza encounters a limitation in the amount of variation and, therefore, an inability to find significant results from the analysis of those two groups. He also recognizes the quantitative nature of his analysis and that the overall picture of the Marine, as developed in sections I and K on a FITREP, is not factored in to his analysis.

Within our analysis of CCLEB, we incorporate the aviation and law category, as those MOSs have similar selection rates on CCLEB to the other MOSs. Most previous studies, including Garza's research, remove the aviation and law categories due to the high selection rates for CD. Our study builds a composite model similar to Garza's, by identifying independent variable categories and gradually building and examining each step along the process.

C. GRINER (2016)

The 2016 Marine Corps study by Griner examines the net change in quality of Marine Corps officers from the buildup, FY 2007 to FY 2009, to the drawdown, FY 2010 to FY 2013, to determine how the changing force structure affects the USMC officer population. The research utilizes FITREPs as the primary gauge of quality as they serve as the main measure of job performance within the Marine Corps officer ranks. Also, Griner uses selection for CD as another proxy for quality. He acknowledges that CD aims to select the highest quality officers for retention.

Griner uses difference-in-difference models to analyze the change in quality to the USMC officer corps. Aviators and lawyers serve as the control group, while all other MOSs serve as a treatment group. Through his analysis, Griner finds evidence that quality has increased within the USMC officer corps during the drawdown based on

increased FITREP scores. Also, Griner discusses that career designation positively contributes to an increase in quality of Marine Corps officers by allowing for a more selective process.

While Griner uses FITREPs as a dependent variable, our analysis utilizes FITREPs as an independent variable in order to determine the value placed on this job performance factor when deciding quality. In addition, by including FITREPs in our model, we can hold job performance factors constant to allow other characteristics to show their impact on selection.

D. SCARFE (2016)

A 2016 Marine Corps study by Scarfe describes the importance of quality retention of Marine Corps personnel, as the Marine Corps is a closed organization and all promotions are internal. The retention of current personnel shapes the future of the force. Scarfe's study analyzes which factors contribute to the departure of high-quality Marines from the junior officer ranks. He also compares performance measures of those retained within the Marine Corps to those who have left the service. The competitive nature of the CD process allows Scarfe to utilize CD as a proxy to measure quality. Scarfe utilizes Meritorious CD, given to the top 5 percent of Marines graduating from The Basic School (TBS), and class standing upon TBS graduation as two additional quality measures.

The study focuses on Marine Corps officers commissioned within the FY 2010 to FY 2012 timespan. This timeframe creates a balanced sample by allowing all of the Marines commissioned to fully meet the requirements to be examined by the board that selects for CD and reach the decision point of whether to accept CD or self-select out of the Marine Corps. The total size of the Scarfe's sample is 3,917 observations, comprised of data collected from both TBS and Total Force Data Warehouse (TFDW).

Scarfe uses three separate models when conducting his analysis. First, he focuses on the entry level factors of each Marine and what the impacts were on meritorious CD at TBS. Next, he develops a model to identify the factors impacting selection by the CD selection board. Finally, Scarfe models the factors impacting the departure of high-quality officers from the Marine Corps. Overall, the research concludes that high-quality officers

were not leaving at a rapid rate but did have a tendency to leave at a slightly higher rate. Also, it is determined that the current TBS evaluation process is an accurate method of measurement of quality, as it has a significant impact on selection for CD.

Our study continues to examine TBS performance as a factor in early prediction of high-quality officers. In addition, our results can be easily compared to Scarfe's to determine if similar factors impact selection by CD and CCLEB.

E. WILER AND HURNDON (2008)

Wiler and Hurndon (2008) examine factors that predict junior officer performance. Their data set focuses on newly commissioned officers from 1999 to 2005. The study utilizes FITREPs as a measure of performance and they focus on TBS data for their key independent variables. They find that TBS leadership and academic scores relate to an increase in performance, and no empirical evidence exist for military skills scores impacting performance.

Similarly, our study examines TBS scores as an early predictor measurement, which demonstrates a Marine's performance during a time period where Marines receive unobserved FITREPs. Chapter V examines TBS scores and more specifically which of the three graded areas demonstrate the most significant effect for selection on CCLEB. By examining these scores, we are able to compare with Wiler and Hurndon's results, while holding FITREPs constant.

F. JOHNSON (2015)

In a 2015, Johnson performs a quantitative study utilizing econometric models to identify significant pre-accession attributes and demographic characteristic that may predict quality. He defines quality as selection for career designation. Johnson aims to identify characteristics that contribute to improved recruiting methods and increase retention efficiencies throughout the Marine Corps. The most significant and actionable finding from Johnson's thesis involve reenrollment waivers. He discovers that individuals who had previously withdrawn from OCS, USNA, or NROTC and require a waiver to reenroll in one of these programs are less likely to be successful, as measured by

selection for career designation. On the same basis, we aim to incorporate valuable variables into our models to demonstrate the Marine Corps current emphasis for selection of high-quality individuals.

G. SUMMARY

An inherent difficulty in quantifying and selecting a "high-quality" employee exists in both the military and civilian job markets. The Marine Corps research studies discussed in Chapter III analyze critical elements that contribute to quality by utilizing FITREPs, TBS performance, and selection for CD as measures of quality. These studies have laid a foundation and through our research project, we are able to continue to analyze if similar variables remain significant. Next, Chapter IV describes how data was gathered and processed for this research. Also, Chapter IV discusses summary statistics and initial analysis of the data.

IV. DATA AND DESCRIPTIVE STATISTICS

This chapter provides in detail the source, collection, and organization of the data utilized in this thesis. This chapter also defines the variables used in the analysis, along with a set of descriptive statistics.

To examine the factors that are the strongest predictors of CCLEB selection outcome, this thesis uses a cross-sectional data set containing 6,074 observations representing individual-level data on all of the Marine officers reviewed by CCLEB in FY 2014, FY 2015, and FY 2016. We built the data set to accurately represent the data available to the board members; in addition, the data set includes some prior performance statistics of each Marine officer. We utilize this data to determine which factors explain best the selection by CCLEB and, therefore, which officer characteristics the Marine Corps values during selection of high-quality company-grade officers.

A. DATA SOURCES

We utilized four different sources to obtain data used in this thesis: Manpower Management Officer Assignments (MMOA), Total Force Data Warehouse (TFDW), The Basic School (TBS), and Manpower Management Records and Performance (MMRP). MMOA-3 provided the foundation for the data set by providing us with a list of all the eligible Marines for each board and supplying amplifying selection information. TFDW contributed demographic characteristics, background information, job performance, and experience data. TBS provided detailed administrative and performance records. MMRP augmented the information with Fitness Report (FITREP) information and statistics.

1. MMOA-3 Data

The plans, programs, and boards section of MMOA, MMOA-3, sponsors, organizes, and executes CCLEB. MMOA-3 provided comprehensive Microsoft Excel documents, which contained the list of Marine officers eligible for each board, as well as additional information examined by board members. The board data for this thesis encompasses three years of data: FY 2014, FY 2015, and FY 2016. The MMOA-3

documents also contained the outcome of the selection boards, which is the main outcome, or dependent variable, for this study.

2. TFDW Data

The Manpower Information Systems Division of Manpower and Reserve Affairs provided a variety of data from TFDW, representing the majority of independent variables used in this thesis. TFDW serves as a comprehensive database to capture and retain monthly data on all personnel throughout the Marine Corps. For the purposes of this study, we selected a snapshot date for the data nearest to the convening of the board to most accurately capture the data available to the board members. By obtaining and utilizing data similar to what the board examined, we hope to accurately portray effects and information utilized for decision making. Table 1 lists the snapshot date for each board. We provided TFDW with the list of Marine officers for each board and the corresponding snapshot date in order to gather the data.

Table 1. Snapshot Dates

CCLEB	Board Convening Date[a]	Snapshot Date	Population
FY 14	10-Sep-13	31-Aug-13	2,188
FY 15	9-Sep-14	31-Aug-14	1,932
FY 16	25-Aug-15	31-Aug-15	1,954
		Total Sample	**6,074**

[a] Convening dates acquired from MCBUL 5420 for each respective year

3. TBS Data

We furnished a list of CCLEB eligible Marine officers to the Testing Office of TBS in order to gather appropriate data for analysis purposes. TBS provided us with TBS class and performance data on each Marine, as well as MOS preferences.

4. MMRP-30 Data

The FITREP data system has the capability to select the data based on the same snapshot method utilized by TFDW. We use FITREP statistics from a Marine's Master Brief Sheet in order to determine cumulative scores of an individual's Reporting Senior (RS) and Reporting Officer (RO). In addition, we used individual FITREPs to reconcile each Marine's MOS with other sources and to determine the number of combat deployments.

B. DATA ACQUISITION AND MERGER

All data sources transmitted data through secure methods utilizing the U.S. Army Aviation and Missile Research Development and Engineering Center's Safe Access File Exchange application. After receiving all of the data in Microsoft Excel format, we immediately imported it into Stata, a statistical analysis software program, in order to append, merge, clean, and analyze the data.

We received the MMOA-3 data in three separate Excel documents and easily imported and appended the files. TFDW data arrived in two separate documents that were ready for merger upon importing into Stata as the list of eligible Marines was already aggregated. One TFDW file contained education data, and the other contained the majority of demographic, performance, and experience data. Likewise, the TBS data file was aggregated and ready for merger upon importing into Stata. The MMRP data required appending, as it arrived in three separate files based on each respective board. We completed the merger of the files based on individual identifiers and also on snapshot date, if required.

C. VARIABLES DESCRIPTION

Table 2 lists and defines the variables utilized during this research. While some variables are indicator (or binary) variables, taking values of zero or one, other variables have value ranges that are continuous. For continuous variables, the ranges given in Table 2 are the minimum and maximum values for the variables in this particular data set and do not necessarily correspond to the overall restriction on that variable.

Table 2. Variable Definitions

Variables	Description	Value
Selected	Selected by CCLEB	= 1 if Selected, = 0 otherwise
Prim	Selected as Primary	= 1 if Primary, = 0 otherwise
Alt	Selected as Alternate	= 1 if Alternate, = 0 otherwise
Female	Gender	= 1 if Female, = 0 otherwise
Non_White	Race	= 1 if Non-White, = 0 otherwise
Single	Marital Status	= 1 if Single, = 0 otherwise
Dependents	Number of Dependents	0 to 7
MECEP	Marine Enlisted Commissioning Educational Program	= 1 if MECEP, = 0 otherwise
NROTC	Naval Reserve Officer Training Corps	= 1 if NROTC, = 0 otherwise
OCC	Officer Candidate Course	= 1 if OCC, = 0 otherwise
PLC	Platoon Leaders Class	= 1 if PLC, = 0 otherwise
Academy	Service Academy	= 1 if Service Academy, = 0 otherwise
Current_photo	Current Photo in OMPF	= 1 if Current Photo in OMPF, = 0 otherwise
xCurrentPhoto	Current Photo Data Missing	= 1 if Missing Data, = 0 otherwise
O2	1st Lieutenant	= 1 if O2 or O2E, = 0 otherwise
O3	Captain	= 1 if O3 or O3E, = 0 otherwise
Prior	Prior Enlisted	= 1 if Prior Enlisted, = 0 otherwise
Years_comm_service	Years of Commissioned Service	2 to 10
Off_Cmbt_Deploy0	Officer Combat Deployments: None	= 1 if 0 Combat Deployments, = 0 otherwise
Off_Cmbt_Deploy1	Officer Combat Deployments: 1	= 1 if 1 Combat Deployment, = 0 otherwise
Off_Cmbt_Deploy2plus	Officer Combat Deployments: 2 or more	= 1 if 2 or more Combat Deployments, = 0 otherwise
Off_Cmbt_Deploy	Number of Officer Combat Deployments	0 to 4
RSCV	Cumulative Average Relative Value of Reporting Senior	80 to 100
ROCV	Cumulative Average Reviewing Officer Relative Value	-3.222 to 2.426
Adverse	Adverse Fitness Report	= 1 if 1 or more Adverse FITREPs, = 0 if none

Variables	Description	Value
TBS_overall	TBS Overall Score	70.04 to 96.01
TBS_acad	TBS Academic Score	70.98 to 98.87
TBS_lead	TBS Leadership Score	74.49 to 99.49
TBS_mil	TBS Military Score	69.41 to 97.64
top3	Assigned to Top 3 MOS Choice	= 1 if Top 3 MOS Choice, = 0 otherwise
GCT_total	General Classification Test Total	80 to 157
PFT_score	PFT Score	143 to 300
PFT_High	PFT Score: 285–300	= 1 if 285 or greater PFT Score, = 0 otherwise
PFT_Mid	PFT Score: 250–284	= 1 if 284 to 250 PFT Score, = 0 otherwise
PFT_Low	PFT Score: Less than 250	= 1 if less than 250 PFT Score, = 0 otherwise
xPFT	Missing PFT Score	= 1 if Missing Data, = 0 otherwise
CFT_score	CFT Score	228 to 300
CFT_300	CFT Score: 300	= 1 if 300 CFT Score, = 0 otherwise
CFT_Mid	CFT Score: 290–299	= 1 if 290–299 CFT Score, = 0 otherwise
CFT_Low	CFT Score: Less than 290	= 1 if less than 290 CFT Score, = 0 otherwise
xCFT	Missing CFT Score	= 1 if Missing Data, = 0 otherwise
Rifle_Exp	Rifle Expert	= 1 if Rifle Expert, = 0 otherwise
Rifle_Sharp	Rifle Sharpshooter	= 1 if Rifle Sharpshooter, = 0 otherwise
Rifle_MarkorUnq	Rifle Marksman or Unqualified	= 1 if Rifle Marksman or Unq, = 0 otherwise
Pistol_Exp	Pistol Expert	= 1 if Pistol Expert, = 0 otherwise
Pistol_Sharp	Pistol Sharpshooter	= 1 if Pistol Sharpshooter, = 0 otherwise
Pistol_MarkorUnq	Pistol Marksman or Unqualified	= 1 if Pistol Marksman or Unq, = 0 otherwise
EE	Rifle Expert and Pistol Expert	= 1 if Rifle Expert & Pistol Expert, = 0 otherwise
Grd	Combat Arms	= 1 if Grd OccFld, = 0 otherwise
CSS	Combat Service Support	= 1 if CSS OccFld, = 0 otherwise
AirGrd	Aviation Ground	= 1 if AirGrd OccFld, = 0 otherwise
Law	Law	= 1 if Law OccFld, = 0 otherwise
Air	Aviation	= 1 if Air OccFld, = 0 otherwise
High_Fitness	300 CFT Score and Greater than or equal to 285 PFT Score	= 1 if CFT=300 & PFT>=285, = 0 otherwise
FY14	Year of Board Eligibility	= 1 if FY14 Board, = 0 otherwise
FY15	Year of Board Eligibility	= 1 if FY15 Board, = 0 otherwise
FY16	Year of Board Eligibility	= 1 if FY16 Board, = 0 otherwise
MOS_XXXX	MOS	= 1 if MOS_XXXX, = 0 otherwise

1. Dependent Variables

In this study, *Selected* is the main variable of interest and is the dependent variable in this analysis. *Selected* is the binary variable that takes the value of 1 if the officer is selected on CCLEB and 0 otherwise. In this thesis, the CCLEB selection outcome serves as a proxy for quality. As stated in Chapter II, FY 2015 is the last CCLEB year that MMOA identified selected Marines as primary or alternate selectees. For the purpose of this study, CCLEB selection accounts for both, primaries and alternates. Table 3 provides the summary statistics of the *Selected* variable, by selection year.

Table 3. Summary Statistics of the Dependent Variable

Variables	Obs	Mean	Std. Dev.	Min	Max
Selected	**6,074**	**0.292**	**0.455**	**0**	**1**
Selected (FY 2014)	2,188	0.261	0.440	0	1
Selected (FY 2015)	1,932	0.290	0.454	0	1
Selected (FY 2016)	1,954	0.328	0.470	0	1
Primary	**4,120**	**0.162**	**0.369**	**0**	**1**
Prim (FY 2014)	2,188	0.155	0.362	0	1
Prim (FY 2015)	1,932	0.170	0.376	0	1
Alternate	**4,120**	**0.113**	**0.316**	**0**	**1**
Alt (FY 2014)	2,188	0.106	0.308	0	1
Alt (FY 2015)	1,932	0.120	0.325	0	1

2. Independent Variables

As the dependent variable captures the outcome of interest, the independent variables measure the factors most likely to explain the dependent variable. The independent variables we use in this study are both, continuous and binary variables, and we defined in the following sections.

a. Preliminary Attributes

The preliminary attributes provide data that is either determined or gathered early in an officer's career. The goal of these variables is to determine if there are early predictors that the Marine Corps can utilize to determine future end states of Marine officers.

(1) Commissioning Source

We gathered the commissioning source for each Marine from the TFDW data set. Two small groups, inter-service transfers and those identified as 'Others', only contained 5 and 36 Marines, respectively. Because of the small numbers, we group inter-service transfers into the Academy category based on not having to fulfill the requirement to attend Officer Candidate School and having similar background exposure to military culture. Also, we group the Other category with the Officer Candidate Course (OCC) based on similar profiles and characteristics. As shown in Table 4, Platoon Leaders Class (PLC) represents the largest commissioning source category, at 30.4 percent of the data set; therefore, this category serves as the control group in the statistical models described later, in Chapter V.

Table 4. Summary Statistics of the Commissioning Source Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
MECEP	6,074	0.143	0.350	0	1
NROTC	6,074	0.154	0.361	0	1
OCC	6,074	0.239	0.427	0	1
PLC *(control group)*	6,074	0.304	0.460	0	1
Academy	6,074	0.160	0.367	0	1

(2) TBS

TBS offers an opportunity for evaluation and assessment early in a Marine officer's career. While the board members of CCLEB do not have immediate access to a Marine's TBS performance, this research uses TBS scores to represent a measure of past performance similar to FITREPs. The studies of McHugh et al. (2006) and Wiler and

Hurndon (2008) both demonstrate the impacts of TBS performance on job performance and promotion, respectively.

Officers graduating from TBS receive an unobserved FITREP; therefore, the TBS time period in an officer's career is not captured by FITREPs. TBS scores allow us to account for the performance of Marine officers while at TBS. *TBS_overall* is an aggregate of the three scored areas: academics, leadership, and military skills. Table 5 details the summary statistics for all four TBS variables.

Table 5. Summary Statistics of the TBS Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
TBS_overall	6,052	86.26	3.797	70.04	96.01
TBS_acad	6,048	87.23	4.296	70.98	98.87
TBS_lead	6,045	85.19	5.655	74.49	99.49
TBS_mil	6,048	86.52	4.122	69.41	97.64

(3) Cognitive Ability

The General Classification Test (GCT) serves as a proxy for cognitive ability of Marine officers. The GCT is administered during a Marine officer's time at TBS. While GCT score should not serve as the sole measure of quality in a Marine Corps officer, as done by a 2015 study from Tufts University, it still serves to measure the intellectual capacity aspect of Marine officer quality (Cancian & Klein). The GCT is a low stakes exam, as MOS assignment, performance scores, and assessments do not depend on the results of this exam. The GCT summary statistics in Table 6 show a mean of approximately 123 and a range of 80 to 157 for this data set.

Table 6. Summary Statistics of the Cognitive Ability Variable

Variables	Obs	Mean	Std. Dev.	Min	Max
GCT_total	6,054	122.8	9.354	80	157

b. Performance

(1) FITREPs

A Marine's performance is periodically reviewed by both their boss (Reporting Senior) and their boss's boss (Reviewing Officer). These periodic reviews are compiled into a FITREP and held in each Marine's permanent record.

Of all the FITREP data provided by MMRP, we utilize two performance variables that would measure a Marine's performance based on the scores from two levels within a Marine's chain of command. First, Reporting Senior Cumulative Value (RSCV) comparatively measures the performance of a Marine Reported On (MRO) in relation to other Marines that a supervisor, Reporting Senior (RS), has evaluated.

> The cumulative relative value. This numeric value reflects the cumulative relative value of the MRO's fitness report based on the RS's rating history for Marines of the same grade as the MRO. This number is a variable and will change as the RS writes additional reports on Marines of the same grade as the MRO. (USMC, 2010)

RSCV accurately reflects the data at the time of the board, as MMRP provided us with a snapshot of all subject's FITREP data to appropriately mimic what the board would have evaluated.

Next, Review Officer Cumulative Value (ROCV) focuses on the next higher tier in a chain of command by analyzing the scores derived from an individual Marine's Reviewing Officer (RO). ROs utilize the pyramid seen in Figure 1 to comparatively rank Marines of the same rank in the assessment of their performance (USMC, 2010).

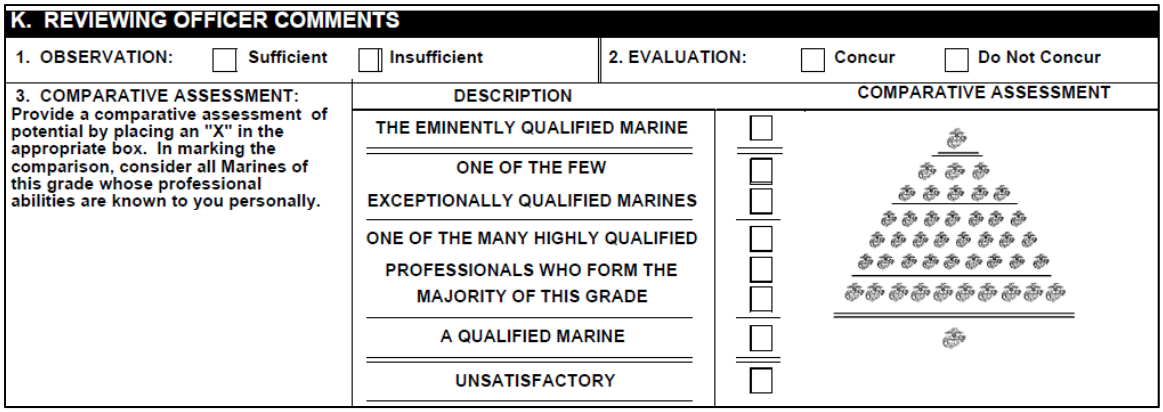

Figure 1. Reviewing Officer Assessment Levels.
Source: USMC Fitness Report (n.d.).

A cumulative relative value for an RO's assessment of a Marine is the respective score compared with all other Marines of the same rank evaluated by the RO. As seen in Table 7, *ROCV* takes on either a positive or a negative number depending on whether the Marine received an above or below average assessment based on the pyramid, respectively. The variable *ROCV* depicts the average of all cumulative relative values a Marine has received.

Table 7. FITREP Variable Summary Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
RSCV	6,037	90.28	3.534	80	100
ROCV	6,069	-0.009	0.503	-3.222	2.426
Adverse	6,074	0.023	0.148	0	1

If an observation in our data set has a missing value in the FITREP variable, it signifies that a Marine had not accumulated sufficient observable FITREP time, or their RO or RS had not written enough FITREPs to develop a large enough profile in order to establish cumulative values. Of the 37 observations with missing values for RSCV, CCLEB only selected one. Of the five observations with missing ROCV values, CCLEB selected zero. When executing the analysis for this research, we drop the observations with missing ROCV or RSCV scores from the models, which may reduce the magnitude

of both FITREP variables and experience variables. The impact of these dropped observations is negligible because the size of the sample missing is not significant enough for concern. These missing values were highly correlated with years of commissioned service, and therefore the experience factors captured these effects.

Despite a relatively high correlation between a Marine's RSCV and ROCV scores, we consider it necessary to include both variables in the analysis, as they are different measurements, and represent different levels of supervision.

We use the variable *Adverse* in this study to reflect the effect of having at least one Adverse FITREP on selection to CCLEB. Only 13 out of 6,074 observations had more than one adverse FITREP; therefore, we created a singular dummy variable to capture all individuals who possessed at least one adverse FITREP. As shown in Table 7, only 2 percent of the total sample had received an adverse FITREP in their career by the time they were reviewed by their respective CCLEB.

c. Job Experience

(1) Time

Job experience of an individual can be derived from a variety of factors. In this study, job experience focuses on time of military service and combat deployments for the evaluated Marine. Over time, Marines accumulate job experience, which takes on multiple forms. Table 8 presents summary statistics on job experience variables.

Table 8. Summary Statistics of the Job Experience Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
O2	6,074	0.451	0.498	0	1
O3	6,074	0.549	0.498	0	1
Prior	6,074	0.167	0.373	0	1
Years_comm_service	6,074	4.961	1.829	2	10
Years_total_service	6,074	7.055	3.914	2	23

For this study, the variables *Years_comm_service* and *Prior* serve as the main proxy for experience in terms of time. *Years_comm_service* highly correlates with the ranks of O-2 and O-3 as increased time of service leads to promotion to the next rank. In

the same way, *Prior* highly correlates with *Years_total_service*, as a Marines' prior enlisted time increases the cumulative time they have in the service. For these reasons, only two variables are needed to capture a Marine's time experience in terms of their time in the military and time as an officer: *Years_comm_service* and *Prior*.

(2) Combat Deployments

Another measure of job experience is based on a Marine's exposure to combat environments. Combat deployments are identified in order to determine the effect a combat deployment has on selection; therefore, these variables demonstrate the importance the board members place on a combat deployment when selecting high-quality officers.

The combat deployments variable received from TFDW seemed to incorrectly track the number of combat deployments, so we derived *Off_Cmbt_Deploy* from examining Marines' FITREPs in order to determine a more reliable number. We examined FITREPs based on the type, as those categorized as "C" or "B" signify the combat duty, or both combat and joint duty, respectively (USMC, 2010). We dropped sequential FITREPs Marine's received during the same deployment, resulting in an accurate cumulative total of combat deployments for each Marine. As seen in Table 9, 46 percent of Marines had zero combat deployments as a commissioned officer, while Marines ranged from zero combat deployments to four combat deployments during their time as an officer. We used the continuous variable of *Off_Cmbt_Deploy* to derive three dichotomous variables representing the range of combat deployments each officer has completed. Less than 2 percent of the officers in this data set have completed more than two combat deployments as an officer; therefore, we grouped those officers with three or four deployments into the *Off_Cmbt_Deploy2plus* variable.

Table 9. Summary Statistics of the Officer Combat Deployment Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Off_Cmbt_Deploy	6,074	0.658	0.733	0	4
Off_Cmbt_Deploy0 (control group)	6,074	0.482	0.500	0	1
Off_Cmbt_Deploy1	6,074	0.394	0.489	0	1
Off_Cmbt_Deploy2plus	6,074	0.125	0.330	0	1

d. Capabilities

(1) Physical Fitness

The Marine Corps has two separate fitness tests that measure the fitness capabilities of Marines. Each test is comprised of three separate events leading to six total events that provide an evaluation of a Marine's physical capability. Based on our research focusing on high-quality Marines, we deem it necessary to focus on the Marines who physically stand out in all events in order to determine what value the Marine Corps places on physical fitness capabilities when selecting high-quality officers. The variable *High_Fitness* identifies Marines who perform at the highest level in the Physical Fitness Test (PFT) and receive a perfect score on the Combat Fitness Test (CFT). As seen in Table 10, 33 percent of the Marines in this sample achieved a PFT score of greater than or equal to 285, 44 percent achieved a perfect 300 score on their CFT, but only 23 percent achieved high fitness marks in both tests.

Table 10. Summary Statistics of the Fitness Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
PFT_score	5,870	273.8	20.04	143	300
PFT_High	6,074	0.326	0.469	0	1
PFT_Mid	6,074	0.532	0.499	0	1
PFT_Low	6,074	0.109	0.311	0	1
xPFT	6,074	0.037	0.180	0	1
CFT_score	5,944	295.5	6.788	228	300
CFT_300	6,074	0.442	0.497	0	1
CFT_Mid	6,074	0.387	0.487	0	1
CFT_Low	6,074	0.149	0.357	0	1
xCFT	6,074	0.021	0.145	0	1
High_Fitness	6,074	0.233	0.423	0	1

By incorporating the variable *High_Fitness*, the results of this variable are better representative of overall fitness due to the incorporation of six uniquely different events rather than focusing on both tests separately.

(2) Marksmanship

In the same way we aggregate fitness, we combine rifle and pistol qualifications to determine individuals with overall high marksmanship capabilities. The variable *EE* signifies individuals who qualify as an expert on both the rifle and pistol. Table 11 shows that 79 percent of Marines in this sample qualify as expert on the rifle, 44 percent on the pistol, but only 39 percent are an expert on both the rifle and pistol.

Table 11. Summary Statistics of the Marksmanship Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Rifle_Exp	6,065	0.792	0.406	0	1
Rifle_Sharp	6,065	0.173	0.378	0	1
Rifle_MarkorUnq	6,065	0.035	0.185	0	1
Pistol_Exp	6,069	0.440	0.496	0	1
Pistol_Sharp	6,069	0.397	0.489	0	1
Pistol_MarkorUnq	6,069	0.163	0.369	0	1
EE	6,074	0.391	0.488	0	1

Combining these variables once again allows for an overall assessment of whether marksmanship capabilities have an effect on those Marines selected as high-quality, rather than looking at each individual event.

e. Demographics

Table 12 details the demographic characteristics variables. These variables include gender, race, marital status, and number of dependents. We derived all of the variables from TFDW data.

The demographic data in Table 12 shows the sample of Marine Officers represented by this data set. These statistics align with the demographic statistics in the 2014 Department of Defense's (DOD) report, showing that the population of this CCLEB data set accurately represents the O-2 and O-3 ranks of the Marine Corps. In the DOD

report, approximately 8 percent of Marine Officers in the rank of O-1 to O-3 are female, which directly corresponds to the 8 percent seen in the data set for this study (DOD, 2014, p. 20). The Non-White percentage within this data set of 15 percent closely resembles the 19 percent for O-1 to O-3 Marine Corps officers (DOD, 2014, p. 28). Finally, 42 percent of officers in this data set are single, which mirrors the 43 percent overall of O-1 to O-3 USMC officers (DOD, 2014, p. 43). The similarity in these numbers demonstrates that the data set for this research accurately reflects the overall Marine Corps cross-section of company-grade officers.

Table 12. Summary Statistics of the Demographic Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Female	6,074	0.082	0.275	0	1
Non_White	6,074	0.152	0.359	0	1
Single	6,074	0.418	0.493	0	1
Dependents	6,074	1.042	1.254	0	7

f. Photo

A MARADMIN directs each Marine screened on CCLEB to ensure an updated photograph is present in their Official Military Personnel File (OMPF) prior to the convening of the board (USMC, 2015). The variable *Current_photo* identifies those Marines who complied with these instructions upon the convening of the board. Table 13 shows that 64 percent of Marines had a current official photograph in their OMPF, meaning the Marine updated their photo within 12 months of the board's convening date (USMC, 2015). The variable *xCurrentPhoto* is added to determine the effect of those 268 Marines whose photo status was not available for this data set, which is four percent of the data set. Of the missing data points, 255 out of 268 are based on a briefer in FY 2014 and another briefer in FY 2015 not correctly tracking these values during the board process. Therefore, these missing values are strictly based on measurement error and do not equate to any other systematic factors.

Table 13. Summary Statistics of the Current Photo Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Current_photo	5,806	0.640	0.480	0	1
xCurrentPhoto	6,074	0.044	0.205	0	1

By intentionally not updating their photo, a Marine can purposefully hinder their chances of selection. It is common knowledge in the Marine Corps that all photographs, and their currency, are examined on boards, and that it is unfavorable to not have an updated photograph in your OMPF.

g. Fiscal Year of Board

Table 14 shows the breakdown of the data set into three separate years: FY 2014, FY 2015, and FY 2016. We developed these binary variables in order to utilize for fixed effects purposes. In order to control for factors that vary from year to year, such as board selection rates, we include FY dummy variables in order to isolate these effects. As the largest group, FY14 serves as the control group in Chapter V for our models.

Table 14. Summary Statistics of the Fiscal Year Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
FY14 (control group)	6,074	0.360	0.480	0	1
FY15	6,074	0.318	0.466	0	1
FY16	6,074	0.322	0.467	0	1

h. MOS

Table 15 lists the breakdown of MOSs for this data set. The mean for each MOS represents the percentage of the total observations that hold that particular MOS. For example, the MOS of 0402 represents 13.5 percent of the sample. We develop these variables in order to hold constant the MOS specific impacts on selection that stem from the precepts.

Table 15. Summary Statistics of the MOS Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
MOS_0102	6,074	0.0364	0.187	0	1
MOS_0202	6,074	0.0175	0.131	0	1
MOS_0203	6,074	0.0250	0.156	0	1
MOS_0204	6,074	0.0100	0.0997	0	1
MOS_0206	6,074	0.0130	0.113	0	1
MOS_0207	6,074	0.0186	0.135	0	1
MOS_0302	6,074	0.119	0.323	0	1
MOS_0370	6,074	0.000494	0.0222	0	1
MOS_0402	6,074	0.135	0.342	0	1
MOS_0602	6,074	0.0914	0.288	0	1
MOS_0802	6,074	0.0655	0.247	0	1
MOS_1302	6,074	0.0505	0.219	0	1
MOS_1802	6,074	0.0122	0.110	0	1
MOS_1803	6,074	0.0137	0.116	0	1
MOS_3002	6,074	0.0473	0.212	0	1
MOS_3404	6,074	0.0230	0.150	0	1
MOS_4302	6,074	0.0135	0.115	0	1
MOS_4402	6,074	0.0339	0.181	0	1
MOS_5803	6,074	0.0230	0.150	0	1
MOS_6002	6,074	0.0229	0.150	0	1
MOS_6602	6,074	0.0155	0.123	0	1
MOS_7204	6,074	0.00593	0.0768	0	1
MOS_7208	6,074	0.0201	0.140	0	1
MOS_7210	6,074	0.0122	0.110	0	1
MOS_7220	6,074	0.00938	0.0964	0	1
MOS_7315	6,074	0.000659	0.0257	0	1
MOS_7509	6,074	0.0120	0.109	0	1
MOS_7523	6,074	0.0155	0.123	0	1
MOS_7525	6,074	0.00626	0.0789	0	1
MOS_7532	6,074	0.0313	0.174	0	1
MOS_7543	6,074	0.00230	0.0480	0	1
MOS_7556	6,074	0.00774	0.0876	0	1
MOS_7557	6,074	0.0123	0.110	0	1
MOS_7562	6,074	0.00214	0.0462	0	1
MOS_7563	6,074	0.0189	0.136	0	1
MOS_7565	6,074	0.0254	0.157	0	1
MOS_7566	6,074	0.0247	0.155	0	1
MOS_7588	6,074	0.00609	0.0778	0	1

i. Aggregated Occupational Field

Table 16 lists the five different MOS Categories, which all 38 MOSs were broken into: Combat Arms (*Grd*), Combat Service Support (*CSS*), Aviation Ground (*AirGrd*),

Law (*Law*), or Aviation (*Air*). These categories allow for accurate comparisons of MOSs with similar missions and skill sets, and prevents dissimilar comparisons. Over 50 percent of the observations in the data set are classified as CSS; therefore, *CSS* serves as the control group in applicable models in Chapter V.

Table 16. Summary Statistics of the Aggregated MOS Category Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Grd	6,074	0.211	0.408	0	1
CSS (control group)	6,074	0.504	0.500	0	1
AirGrd	6,074	0.0866	0.281	0	1
Law	6,074	0.0339	0.181	0	1
Air	6,074	0.165	0.371	0	1

We utilized the same MOS categories utilized in the Officer Retention Boards that select Marines for Career Designation. Table 17 details how the Officer MOSs are categorized.

Table 17. MOS Categories[a]

Combat Arms (*Grd*)	Combat Service Support (*CSS*)	Aviation Ground (*AirGrd*)	Law (*Law*)	Aviation (*Air*)
0302	0102	6002	4402	75XX
0370	02XX	6602		
0802	0402	7204		
1802	0602	7208		
1803	1302	7210		
	3002	7220		
	3404			
	4302			
	5803			

[a] MOS Categories mimic the competitive categories used for Career Designation (Garza, 2014)

D. DESCRIPTIVE STATISTICS OF THE DATA SET

The descriptive statistics portion of this chapter provides a comparison of means of two population groups: selected vs non-selected. Selection by CCLEB is the dependent variable used in the models in Chapter V and is the variable used in the following section

for t-tests to separate the two groups. T-tests analyze each independent variable by comparing the means for each independent population group. The t-test is used to test the null hypothesis that means for any given criteria are statistically the same for both population groups. If the t-test allows us to reject the hypothesis, we learn that the summary statistics by that criterion are statistically different, in which case we use multivariate analysis in Chapter V to identify what factors explain the differences.

The t-tests results presented in the subsequent sections shows whether the difference between the means of the two groups is significant or not. The significance levels for each variable represent confidence intervals of 90 percent (*), 95 percent (**), or 99 percent (***). Each table provides the mean for each variable for the entire sample (Full Sample), the Marines selected by CCLEB (Selected), and those Marines not selected (Not Selected).

1. Early Predictors

When examining the t-tests on CCLEB selection rates by the early predictors categories in Table 18, the data appears to show a larger percentage of MECEP and OCC officers in the Selected group, while NROTC and PLC officers seem to have lower percentages of selection. Those Marines who attended a military academy appear equally represented in both the selected and non-selected populations, at 16 percent representation each.

All of the scored variables, TBS scores and GCT, seem to have higher averages with the selected population than the non-selected population. For example, the TBS leadership score for the entire sample is 85, while the selected population has a mean of 87 and the non-selected population has a mean of 84. In Chapter V, we explore the likely explanations on selection rate differences by these variables.

Table 18. T-Tests by Early Predictors

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
MECEP	0.143	0.211	0.115	***
NROTC	0.154	0.137	0.161	**
OCC	0.239	0.258	0.232	**
PLC	0.304	0.232	0.333	***
Academy	0.160	0.162	0.159	
TBS_overall	86.257	87.583	85.710	***
TBS_acad	87.233	88.252	86.813	***
TBS_lead	85.189	87.038	84.425	***
TBS_mil	86.518	87.400	86.154	***
GCT_total	122.757	123.315	122.526	***

2. Job Performance

When comparing the selection rates by job performance, Table 19 shows the population of Marines selected on CCLEB has a 3.5 point higher average for RSCV and a positive ROCV compared to the negative average ROCV of the non-selected population.

Table 19. T-Tests by Job Performance Variables

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
RSCV	90.283	92.777	89.246	***
ROCV	-0.009	0.359	-0.161	***
Adverse	0.023	0.004	0.030	***

3. Experience

Table 20 shows that the population of Marines selected on CCLEB has a higher average level of job experience, in terms of years of commissioned service, prior enlisted time, and combat deployments.

Table 20. T-Tests by Job Experience Variables

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
Years_comm_service	4.961	5.441	4.763	***
Prior	0.167	0.246	0.134	***
Off_Cmbt_Deploy0	0.482	0.375	0.525	***
Off_Cmbt_Deploy1	0.394	0.441	0.374	***
Off_Cmbt_Deploy2plus	0.125	0.184	0.100	***
Off_Cmbt_Deploy	0.658	0.834	0.586	***

4. Training

Similar to the job experience variables and early career scores, training variables also reflect higher means for the selected population compared with the non-selected population. For example, Table 21 shows that the PFT average score of the selected population is over 5 points higher than the non-selected population.

Table 21. T-Tests by Training Variables

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
High_Fitness	0.233	0.305	0.204	***
PFT_score	273.833	277.402	272.369	***
PFT_High	0.326	0.390	0.300	***
PFT_Mid	0.532	0.503	0.544	***
PFT_Low	0.109	0.071	0.124	***
xPFT	0.034	0.037	0.032	
CFT_score	295.469	296.445	295.065	***
CFT_300	0.442	0.519	0.411	***
CFT_Mid	0.387	0.346	0.403	***
CFT_Low	0.149	0.115	0.164	***
xCFT	0.021	0.019	0.022	
EE	0.391	0.434	0.373	***
Rifle_Exp	0.792	0.816	0.782	***
Rifle_Sharp	0.173	0.154	0.180	**
Rifle_MarkorUnq	0.035	0.029	0.038	
Pistol_Exp	0.440	0.480	0.424	***
Pistol_Sharp	0.397	0.383	0.403	
Pistol_MarkorUnq	0.163	0.137	0.173	***

5. Photo

Table 22 shows that approximately 75 percent of the selected population had a current photo in their OMPF, and only 60 percent of the non-selected population had a current photo. The *xCurrentPhoto* variable is not statistically significant, which supports that the missing data is random and no systematic variation exists.

Table 22. T-Tests by Photograph Variables

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
Current_photo	0.640	0.747	0.595	***
xCurrentPhoto	0.044	0.042	0.045	

6. Demographics

Table 23 shows that a higher percentage of females make up that selected population, and non-whites and single Marines make up a smaller percentage of the selected population compared to the non-selected population.

Table 23. T-Tests by Demographic Variables

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
Female	0.082	0.115	0.069	***
Non_White	0.152	0.135	0.159	**
Single	0.418	0.317	0.460	***
Dependents	1.042	1.310	0.931	***

7. Aggregated Occupational Fields

Table 24 demonstrates that the selected population has a higher percentage of CSS Marines and lower percentage of Aviation marines when compared to the non-selected population.

Table 24. T-Tests by Aggregated Occupational Fields

Variable	Mean			Significance Level for T-Test: Selected vs Non-Selected
	Full Sample	Selected	Not Selected	
Grd	0.211	0.224	0.205	
CSS	0.504	0.523	0.496	*
AirGrd	0.087	0.085	0.087	
Law	0.034	0.036	0.033	
Air	0.165	0.133	0.178	***

E. SUMMARY

This chapter describes the sources of data, the procurement of that data and initial processing. In addition, we provided definitions of each variable used in this study, and summary statistics. Chapter V analyzes the data utilizing multivariate statistical models in order to identify significant factors that explain selection of high-quality officers by CCLEB.

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V. ANALYSIS OF FACTORS ASSOCIATED WITH CCLEB SELECTION

This chapter uses multivariate statistical models to examine which independent variables are most likely to explain a Marine's selection on CCLEB and therefore demonstrate important characteristics in determining high quality. The models we utilize in Chapter V allow us to hold factors constant in order to determine the effects of a specific variable, rather than solely analyzing one variable at a time.

A. METHODOLOGY

The strength of multivariate statistical models, or regression analysis, comes from the capacity to model as close as possible the CCLEB selection mechanism by incorporating different variables in an effort to identify what explains the variation in selection rates. The models we utilize in this chapter have a dependent variable that is categorical, or binary response variable; therefore, the models are estimated using probit regression models.

When the dependent variable is a binary variable, a probit model is superior to linear probability models because fitted probabilities in a binary response model remain between 0 and 1, rather than taking on negative values or greater than 1 probabilities as they would in a linear probability model (Wooldridge, 2009). The probit regression results in Table 25 and Table 26 show the coefficient result for each variable, as well as the standard error deviation. The coefficient is either positive or negative in magnitude. A positive coefficient result signifies that a positive response of 1, or an increase, for the independent variable is associated with an increase in the likelihood of selection on CCLEB for an individual Marine. Vice versa, a negative coefficient can be equated to a reduction in the likelihood of selection. Our results focus on the statistically significant variables that are identified based on their confidence intervals of 90 percent (*), 95 percent (**), or 99 percent (***).

1. Composite Model

We begin our analysis by utilizing composite models, which incrementally adds variable categories to our analysis. Through each of the seven stages, the statistical significance, or lack thereof, is identified. Equation 1 depicts the probit equation we used in the final stage of our composite modeling.

$$\begin{aligned} P(Selected) = G(&\beta_0 + \beta_1 \text{EarlyPredictors} + \beta_2 \text{JobPerformance} + \\ &\beta_3 \text{Experience} + \beta_4 \text{Training} + \beta_5 \text{Demographics} + \\ &\beta_6 \text{BoardSpecific} + \text{YearFixedEffects}) \end{aligned} \quad (1)$$

We gradually build to our final model in order to monitor the magnitudes and statistical significance of the coefficients at each stage. Utilizing a composite model allows us to see whether each category reduces statistical significance of previously added variables or adds explanatory power itself to the model. We evaluate each stage in order to determine additional information that explains the CCLEB selection process and contributing factors.

We chose to include quantitative variables that mimic the data available to the board members on each CCLEB. We also add a few early career predictors to determine whether factors exist to predict selection of high-quality Marines.

2. Aggregated Occupational Field

We use the final model from the composite model process as a baseline for the next analysis as we examine the effects of each variable in separate aggregated occupational fields. As discussed in Chapter IV, we created five separate dichotomous variables to categorize the MOS category for each Marine. The baseline model is run within each aggregated occupational field in order to identify factors that may demonstrate statistical significance in some aggregated occupational fields and not others.

3. Control Group

The control group for all of the regressions in this thesis is represented by the following officer:

- Gender: Male
- Marital Status: Married
- Race: White
- Current Photo: No
- Physical Fitness: Less than 300 CFT and/or less than 285 PFT
- Marksmanship: Not an expert on rifle and/or not an expert on pistol
- Deployments: Zero Combat Deployments as an officer
- Prior Enlisted: No
- Commissioning Source: PLC
- OccFld: CSS
- Year: FY 2014

B. COMPOSITE MODEL

The composite model incrementally adds variable categories in seven stages in order to monitor and track the significance and examine where the explanatory power lies. The final stage incorporates variables that serve as fixed effects in order to control for change in selection rates between the three years of the data set. Table 25 displays the results of the seven stages of the composite models.

Table 25. Composite Model

Variables	Stages						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Early Career Predictors							
MECEP	0.1713***	0.0280	0.0156	0.0178	0.0119	0.0145	0.0201
	(0.0211)	(0.0196)	(0.0301)	(0.0302)	(0.0300)	(0.0307)	(0.0312)
NROTC	0.0294	-0.0172	0.0297	0.0254	0.0154	0.0062	-0.0015
	(0.0196)	(0.0184)	(0.0197)	(0.0196)	(0.0192)	(0.0192)	(0.0189)
OCC	0.1041***	0.0359**	0.0128	0.0096	0.0041	0.0001	0.0028
	(0.0175)	(0.0169)	(0.0159)	(0.0158)	(0.0156)	(0.0158)	(0.0159)
Academy	0.0724***	0.0032	0.0390**	0.0336*	0.0179	0.0133	0.0107
	(0.0200)	(0.0187)	(0.0195)	(0.0194)	(0.0190)	(0.0192)	(0.0190)
TBS_overall	0.0282***	0.0107***	0.0045***	0.0023	0.0043**	0.0043**	0.0054***
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0018)
GCT_total	-0.0020***	0.0000	-0.0003	-0.0000	0.0001	0.0002	0.0004
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Job Performance							
RSCV		0.0356***	0.0419***	0.0419***	0.0412***	0.0411***	0.0412***
		(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
ROCV		0.3396***	0.3706***	0.3661***	0.3586***	0.3546***	0.3531***
		(0.0173)	(0.0172)	(0.0172)	(0.0171)	(0.0174)	(0.0175)
Job Experience							
Prior			0.0284	0.0333	0.0293	0.0181	0.0110
			(0.0279)	(0.0282)	(0.0282)	(0.0281)	(0.0279)
Years_comm_service			0.0713***	0.0736***	0.0716***	0.0743***	0.0703***
			(0.0036)	(0.0037)	(0.0038)	(0.0039)	(0.0039)
Off_Cmbt_Deploy1			0.0236*	0.0235*	0.0299**	0.0319**	0.0509***
			(0.0129)	(0.0128)	(0.0129)	(0.0131)	(0.0135)
Off_Cmbt_Deploy2plus			0.0397**	0.0392*	0.0450**	0.0516**	0.0906***
			(0.0201)	(0.0200)	(0.0202)	(0.0208)	(0.0230)
Training							
EE				0.0236**	0.0281**	0.0246**	0.0160
				(0.0118)	(0.0118)	(0.0120)	(0.0120)
High_Fitness				0.0764***	0.0710***	0.0615***	0.0603***
				(0.0148)	(0.0148)	(0.0150)	(0.0150)
Demographics							
Female					0.1539***	0.1531***	0.1525***
					(0.0267)	(0.0276)	(0.0276)
Non_White					-0.0062	-0.0023	-0.0026
					(0.0162)	(0.0167)	(0.0167)
Single					-0.0354**	-0.0252	-0.0234
					(0.0153)	(0.0157)	(0.0157)
Dependents					-0.0018	-0.0019	-0.0013
					(0.0065)	(0.0067)	(0.0067)
Photograph							
Current_photo						0.0831***	0.0882***
						(0.0114)	(0.0114)
Fiscal Year (Fixed Effects)							
FY15							0.0319**
							(0.0146)

Variables	Stages						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FY16							0.1181***
							(0.0162)
Observations	6,032	5,995	5,995	5,995	5,995	5,729	5,729
Pseudo_R_Sq	0.0566	0.266	0.337	0.342	0.348	0.357	0.366
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1							

1. Early Career Factors

Any statistically significant variables for commissioning source are in comparison to the control group: PLC. As we add more variables to the model in Table 25, any statistically significant commissioning source variable loses its explanatory power, eventually resulting in no statistically significant commissioning source variables. Similar to Commissioning Source, GCT score is not statistically significant after the first stage.

TBS_overall remains statistically significant at the 1 percent level throughout all stages of the composite model. This coefficient is positive in magnitude and therefore indicates an association of an increase in probability of selection by CCLEB with an increase in overall score at TBS. Appendix A contains the results of a regression with the *TBS_overall* score disaggregated into the three separate categories: academics, leadership, and military skills. Table 27 in Appendix A shows that the variable of academics is the only statistically significant TBS score variable. The absence of statistical significance for leadership and military skills only signifies that no empirical evidence exists with this data set.

In the results of Wiler and Hurndon (2008), they conclude that mainly the TBS leadership score positively affects quality in terms of FITREPs. Table 28 in Appendix B, demonstrates that when the FITREP variables, *ROCV* and *RSCV*, are added to the composite model, the explanatory power of the TBS leadership score disappears, leaving only TBS academic score as statistically significant. In summary, it appears that the TBS leadership score indirectly increases the likelihood of selection on CCLEB based on the positive correlation it has with job performance, as measured by FITREPs.

Likewise, a CNA study in 2006 determined a positive relationship between TBS standing and promotion to Major (McHugh et al., p. 70). Similar to CCLEB, promotion boards aim to select high-quality individuals, and therefore the 2006 study demonstrates similar findings to our research.

2. Job Performance

Both job performance variables in the models of Table 25 reveal statistical significance regardless of how many other variables are added to the model. The coefficient of *RSCV* can be interpreted as: if Marine's RSCV score increases by one (i.e., a 90 to a 91) then the probability of selection on CCLEB is increased by approximately 0.04, when holding other factors constant. Likewise, an increase of one on the ROCV results in an increased probability of approximately 0.35 in the probability of selection by CCLEB, holding other factors constant.

Clearly, an increase of one on RSCV is not comparable to an increase of one in ROCV. In order to accurately compare the two coefficients, we normalized the variables in Stata by adjusting the means to zero and the standard deviations to one. Table 29 in Appendix C represents the normalized variables. The coefficients show that the ROCV possesses a greater magnitude once normalized, and we can therefore infer that greater value is placed on the ROs assessment scores than the RSs assessment scores by board members. There could be a variety of explanations for this, for example: the RO is of a higher rank than the RS, or the ROs assessments are typically briefed after the RSs assessment and are therefore more recently in the board members mind when voting.

3. Experience

The experience variables of the model in Table 25 allow us to examine the effects of years of commissioned service, being prior enlisted, and number of combat deployments as an officer. The prior enlisted variable is not statistically significant in any of the models, which means there is no empirical evidence for its effect on the dependent variable in this data set. Both of the other categories are statistically significant and positive in magnitude, which signify that each factor is associated with an increase in the likelihood a Marine's selection on CCLEB with an increase in experience, holding other

factors constant. For example, each increase in one year of commissioned service is related to an increase of 0.07 probability for selection on CCLEB. These results imply that the Marine Corps values experience in terms of years of service and combat deployments.

Some could argue that the variable for years of commissioned service represents a proxy for seniority in our models. In Tim Kane's book, *Bleeding Talent*, he discusses one shortcoming of the current military manpower system: a heavy reliance on seniority vice merit for promotion and selection. Our models therefore support Kane's assertion as each year of additional commissioned service, a proxy for seniority, is associated with an increase of 0.07 in the probability of selection by CCLEB, holding other factors constant.

4. Training

Training is the next category added to the composite model and encompasses the variables representing marksmanship skills and physical fitness. Initially, the marksmanship variable was at a 95 percent level of significance, but once we added FY fixed effects, the significance disappeared. The physical fitness variable, *High_Fitness*, remained at a 99 percent level of significance for all models. This variable demonstrates that the CCLEB members placed value in those Marines with high physical fitness performances when selecting high-quality individuals for advanced educational opportunities.

5. Demographics

The only notable demographic variable was the gender variable, *Female*. These models identify the effect of being a female as increasing a Marine's likelihood of selection on CCLEB by a probability of 0.15, holding all other factors constant.

6. Board Specific

The photo variable is arguably the variable that a Marine can most easily influence out of all of the independent variables. Possessing a current photo signifies a Marine is adhering to the directive detailed in each board's initial MARADMIN. As seen in Table 25, the variable *Current_photo* is statistically significant in the final two models.

A current photo is associated with an increase in the likelihood of selection on CCLEB by a probability of 0.08, holding other factors constant.

Based on this information, it shows that the CCLEB board members place substantial value on an updated photograph inside each OMPF. This value could stem from an officer's ability to follow instructions, or simply could be a proxy for a Marine's desire and motivation. Only the board members are able to identify how an updated photograph influences their decision making process.

C. AGGREGATED OCCUPATIONAL FIELD MODEL

The first model in Table 26 displays the results of the basic model, which is the final iteration of the composite models. We then utilize the MOS categories as fixed effects in our "Basic w/ AggOccFld" model, and finally, we developed a separate model for each MOS category.

Table 26. Aggregated Occupational Field Models

Variables	Aggregated Occupational Field						
	Basic	Basic w/ AggOccFld	Grd	CSS	AirGrd	Law	Air
Early Career Predictors							
MECEP	0.0201	0.0188	0.1427	0.0589	-0.0545		-0.0855**
	(0.0312)	(0.0312)	(0.1276)	(0.0453)	(0.0773)		(0.0428)
NROTC	-0.0015	-0.0037	-0.0408	0.0271	-0.0487		-0.0309
	(0.0189)	(0.0189)	(0.0342)	(0.0284)	(0.0710)		(0.0387)
OCC	0.0028	0.0014	-0.0251	0.0134	-0.0521	-0.0054	0.0168
	(0.0159)	(0.0159)	(0.0321)	(0.0247)	(0.0519)	(0.0775)	(0.0352)
Academy	0.0107	0.0116	-0.0339	0.0181	-0.0407		0.0768*
	(0.0190)	(0.0193)	(0.0362)	(0.0286)	(0.0657)		(0.0447)
GCT_total	0.0004	0.0006	0.0009	0.0011	-0.0039	0.0041	0.0008
	(0.0007)	(0.0007)	(0.0015)	(0.0009)	(0.0026)	(0.0046)	(0.0016)
TBS_overall	0.0054***	0.0062***	0.0061	0.0056**	0.0122*	-0.0160	0.0126***
	(0.0018)	(0.0019)	(0.0041)	(0.0026)	(0.0066)	(0.0132)	(0.0045)
Job Performance							
RSCV	0.0412***	0.0408***	0.0479***	0.0432***	0.0346***	0.0482***	0.0356***
	(0.0023)	(0.0024)	(0.0063)	(0.0031)	(0.0078)	(0.0125)	(0.0062)
ROCV	0.3531***	0.3495***	0.3444***	0.3503***	0.3759***	0.7112***	0.2422***
	(0.0175)	(0.0175)	(0.0382)	(0.0247)	(0.0626)	(0.1460)	(0.0425)
Job Experience							
Prior	0.0110	0.0071	-0.0663	0.0130	-0.0676	-0.1024	0.0736
	(0.0279)	(0.0278)	(0.0665)	(0.0371)	(0.0734)	(0.3763)	(0.0768)

Variables	Aggregated Occupational Field						
	Basic	Basic w/ AggOccFld	Grd	CSS	AirGrd	Law	Air
Years_comm_service	0.0703***	0.0756***	0.0975***	0.0687***	0.0663***	0.2194***	0.0728***
	(0.0039)	(0.0045)	(0.0112)	(0.0062)	(0.0134)	(0.0425)	(0.0139)
Off_Cmbt_Deploy1	0.0509***	0.0446***	0.0340	0.0610***	0.0655	0.0479	0.0424
	(0.0135)	(0.0140)	(0.0335)	(0.0208)	(0.0464)	(0.1089)	(0.0287)
Off_Cmbt_Deploy2plus	0.0906***	0.0750***	0.0675	0.1087***	-0.0076		0.0878*
	(0.0230)	(0.0240)	(0.0515)	(0.0391)	(0.0664)		(0.0496)
Training							
EE	0.0160	0.0151	0.0413	0.0020	0.0506	-0.0579	-0.0095
	(0.0120)	(0.0120)	(0.0256)	(0.0171)	(0.0418)	(0.0807)	(0.0265)
High_Fitness	0.0603***	0.0591***	0.0519*	0.0550***	0.1318**	0.1502	-0.0132
	(0.0150)	(0.0150)	(0.0298)	(0.0209)	(0.0620)	(0.1124)	(0.0344)
Demographics							
Female	0.1525***	0.1466***		0.1582***	0.0938	0.3403**	0.0156
	(0.0276)	(0.0278)		(0.0330)	(0.0807)	(0.1643)	(0.0722)
Non_White	-0.0026	-0.0048	0.0005	0.0032	0.0501	-0.0206	-0.0684*
	(0.0167)	(0.0166)	(0.0423)	(0.0226)	(0.0533)	(0.1334)	(0.0370)
Single	-0.0234	-0.0259*	-0.0765**	-0.0296	0.0259	-0.1262	0.0080
	(0.0157)	(0.0157)	(0.0341)	(0.0225)	(0.0590)	(0.0974)	(0.0374)
Dependents	-0.0013	-0.0021	-0.0249	-0.0066	0.0181	-0.0335	0.0143
	(0.0067)	(0.0067)	(0.0158)	(0.0097)	(0.0211)	(0.0554)	(0.0136)
Photograph							
Current_photo	0.0882***	0.0861***	0.0780***	0.1059***	0.1296***	0.0105	0.0377
	(0.0114)	(0.0114)	(0.0238)	(0.0161)	(0.0392)	(0.0801)	(0.0257)
Fiscal Year (Fixed Effects)							
FY15	0.0319**	0.0283*	0.0302	0.0807***	-0.0465	-0.1796***	-0.0260
	(0.0146)	(0.0146)	(0.0313)	(0.0222)	(0.0460)	(0.0667)	(0.0304)
FY16	0.1181***	0.1134***	0.1134***	0.1723***	-0.0029	-0.1483*	0.0730**
	(0.0162)	(0.0162)	(0.0371)	(0.0248)	(0.0480)	(0.0780)	(0.0339)
Aggregated Occupational Field (Fixed Effects)							
Grd		-0.0242					
		(0.0149)					
AirGrd		-0.0330*					
		(0.0187)					
Law		-0.0308					
		(0.0287)					
Air		-0.0549***					
		(0.0173)					
Observations	5,729	5,729	1,212	2,874	496	193	951
Pseudo_R_Sq	0.366	0.368	0.455	0.379	0.348	0.453	0.308

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1. Early Career Factors

The aviation specific model is the only model in Table 26 where commissioning source is statistically significant. When compared to a Marine who commissioned through PLC, an aviation Marine commissioning through MECEP is associated with a decrease of 0.0855 in the probability of selection on CCLEB. In contrast, an aviation Marine who attended a military academy is associated with an increase of 0.0768 in the probability of selection on CCLEB compared to a PLC aviation Marine. Overall, there appears to be minimal effects from commissioning source on selection to CCLEB, with the only statistically significant coefficients appearing in the aviation specific model.

A 2015 study by Cancian and Klein utilized GCT scores as a sole measure of quality in determining whether Marine Corps officer quality is declining. Based on the results in Table 26, GCT scores are not statistically significant; therefore, this data set shows no effects of GCT on selection of high-quality officers. This data set does not support the bold assumption made by Cancian and Klein that GCT measures quality. As discussed in Chapter IV, the GCT score is a low stakes exam that has no implications on an officer's career, nor is it examined by board members of CCLEB; therefore, the Marine Corps does not currently utilize GCT as a measure of quality.

In Table 26, the statistical significance seen in the basic model for *TBS_overall* scores appears to be deriving its explanatory power from the CSS, AirGrd, and Air communities. While all coefficients are positive, the aviation community coefficient is the largest magnitude and most statistically significant out of the three. The aviation specific model appears to demonstrate that an increase in TBS performance for an aviator is associated with an increase in the probability of selection as the "best and fully qualified" by CCLEB, when holding other factors constant (USMC, 2015). These findings are surprising due to the minimal impact TBS performance has on an aviator's career. An overwhelming majority of aviators are assigned to the aviation community prior to TBS and therefore receive no reward for improved results at TBS.

2. Job Performance

Consistent with the results from the composite models, the job performance variables, *RSCV* and *ROCV*, are statistically significant in every model detailed in Table 26. These results demonstrate that job performance, in terms of FITREPs, is valued by the board members of CCLEB and important across all spectrums of USMC occupational fields. These results support the Commandant of the Marine Corps' mission statement for the FITREP process:

> The fitness report provides the primary means for evaluating a Marine's performance to support the Commandant's efforts to select the best qualified personnel for promotion, augmentation, retention, resident schooling, command, and duty assignments. (USMC, 2010)

3. Experience

In Table 26, the statistical significance and explanatory power of combat deployments as an officer in the basic model seems to stem from the CSS community. Within the CSS community, in comparison to zero combat deployments, one or two plus combat deployments are associated with an increase of 0.061 and 0.109 in probability of selection on CCLEB, respectively. These results appear to show that the board members valued combat deployments in the CSS community more than other aggregated occupational fields.

4. Training

Table 26 shows no statistically significant coefficients in the marksmanship category, but *High_Fitness* is statistically significant in three of the five aggregated occupational field categories. Combat arms, CSS, and aviation ground all show statistically significant coefficients for *High_Fitness* and all are positive in magnitude. The absence of statistical significance in the other two categories does not mean there is no relation; it simply means that this data set shows no empirical evidence of an effect.

5. Demographics

The predominance of the explanatory power and statistical significance of the *Female* variable in the basic model of Table 26 appears to stem from the CSS

community. Although the Law community shows a statistically significant coefficient with a high magnitude for *Female*, the population size of the Law community in this data set is only 193 Marines, which is only 3 percent of the total data set. Within the CSS community, being a Female is associated with an increase of 0.158 in the probability of selection by CCLEB, holding other factors constant.

6. Board Specific

Three models in Table 26 have statistically significant variables for *Current_photo*. The combat arms, CSS, and aviation ground communities show coefficients that are positive in magnitude, which signifies an increase in the probability of selection by CCLEB if the Marines have updated their photograph in their OMPF.

D. SUMMARY

Chapter V provides two separate approaches to modeling the results: composite models and models for each aggregated occupational field. These approaches allow us to analyze trends in the coefficients and to determine which occupational fields contributed to the statistical significance and explanatory power of the coefficients. We provide explanations of the results and conjectures as to the contributing factors of the results. Based on the results of Chapter V, Chapter VI compiles the findings and discusses the conclusions for each of the research questions. In addition, we provide recommendations for further action in Chapter VI.

VI. CONCLUSION

A. FINDINGS

Our research goal was to determine characteristics and attributes the Marine Corps values when selecting high-quality individuals. Specifically, we utilized three years of CCLEB data, from FY 2014 to FY 2016, to analyze factors that predict selection by CCLEB, as a measure of high quality among Marine officers. This chapter summarizes the results of the analysis and discusses recommendations for follow-on research.

1. Primary Research Question: What Characteristics and Attributes Indicate Selection of High-Quality Company-Grade Officers?

Based on the results of the analysis conducted in this thesis, the Marine Corps selects quality by mainly relying on job performance measures, as derived from FITREPs, and job experience, as demonstrated by years of commissioned service and officer combat deployments. Although not readily available to board members, a Marine's TBS scores appear to be an early predictor of selection as high quality.

a. Performance

FITREPs are an obvious metric utilized when examining the quality of an officer. FITREPs are a benchmark of performance and continue to positively contribute to Marine Corps talent management.

As discussed in Chapter V, the TBS overall performance is statistically significant and positive in magnitude, demonstrating that an increase in overall TBS performance is associated with an increase in the likelihood of selection by CCLEB. Our models in Appendix A show that the majority of the significance in the *TBS_overall* coefficient stems from the TBS academic scores. Based on the models in Chapter V, we conclude that both TBS academic and leadership scores are associated with selection on CCLEB. Academic score is directly associated with selection, and leadership scores indirectly affect through FITREP scores. Multiple research studies, such as Wiler and Hurndon

(2008), Scarfe (2016), and McHugh et al. (2006), support the findings that the TBS evaluation process is an effective method in predicting the performance and quality of a Marine officer.

b. Experience

The results of our study show that the statistical significance for experience variables relate to years of commissioned service and combat deployments. While years of commissioned service demonstrate that board members value seniority in each aggregated occupational field, the explanatory power and statistical significance of combat deployments is most apparent within the CSS community.

2. Secondary Research Question: Does the Marine Corps Place Differing Levels of Importance on Characteristics and Attributes for Different Aggregated Occupational Fields?

The aggregated occupational fields models help determine which aggregated occupational field contributes to the statistical significance and explanatory power of variables in the basic model. The notable models are for the CSS and Aviation communities. The CSS model shows the highest number of statistically significant variables at nine. The board members appears to value combat deployments in the CSS community much more than they value combat deployments in other communities. Also, females in the CSS community appear to have an increased probability of selection on CCLEB by 0.158.

The aviation community results demonstrate that TBS appears to be an early predictor of selection as a quality Marine by CCLEB, even though TBS performance has little impact on aviators' career paths.

3. Secondary Research Question: How Important Is an Up-to-Date Photograph in Selection on CCLEB?

Based on the results in Chapter V, the Marine Corps places significant emphasis on having an up-to-date picture in a Marine's OMPF. Many could argue that this metric is a proxy for ability to follow orders, desire, or motivation. By simply looking at the data, we are unable to tell if this value stems from ensuring Marines follow the directives

given to them, or if it is based on the importance of maintaining a professional appearance. Because photos are one of the top four significant factors in the models, the Marine Corps is essentially emphasizing this one factor above many other factors. It is apparent that board members value this factor, but our research does not provide detailed information why.

B. LIMITATIONS

The photograph analysis in this research is strictly limited to a quantitative analysis in terms of whether an updated photograph is present in a Marine's OMPF or not. Our research does not include the effects of professional and physical appearance of each Marine in their photo, nor does it factor in those Marines who intentionally failed to update their photo.

As discussed in Chapter II, CCLEB has undergone numerous changes throughout the year, culminating with an overhaul of the board selection process for FY 2017. The methodology, assumptions, and premise for this research can only be applied to the boards prior to FY 2017, but the finding of what qualities the Marine Corps values is applicable to the current Marine Corps.

The FITREP data utilized in this analysis is solely quantitative; however, Section I and Section K of each FITREP allows each Marine's RS and RO to develop a word picture of the Marine being evaluated. These sections are available to each briefer and provide additional facts and supporting arguments to back up or refute the data provided about each Marine. It may be that the words written in Section I and Section K are the most valuable element in determining a high-quality Marine, as those sections provide a detailed written word picture of each Marine.

C. RECOMMENDATIONS

Because Section I and Section K in a Marine's FITREP are highly valuable in painting an accurate picture of each Marine, it is my recommendation that a future study analyze these sections to give insight into trends, both positive and negative.

Since Advanced Educational opportunities have migrated from all-volunteer to selection based, it is imperative to examine the effects of CCLEB selection on promotion and retention. Studying the promotion effects of selection on CCLEB will help to determine whether the Marine Corps is mismanaging assets into which they have invested time and resources through these educational opportunities. In addition, examining the retention impacts of CCLEB will help to determine lasting impacts on talent management. Lastly, by looking at the changes in selection and retention rates over the years, the goals of CCLEB can be evaluated as having been met or not. We feel that the appropriate time to measure advanced selection is on the O-5 board and the command selection board. These boards are more competitive than the O-4 selection board and will allow for a more distinct result in long-term impacts of CCLEB selection.

APPENDIX A. TBS SCORES

Table 27. TBS Scores—Disaggregated

Variables	Overall Score	Separated Scores
MECEP	0.0201 (0.0312)	0.0204 (0.0313)
NROTC	-0.0015 (0.0189)	-0.0012 (0.0190)
OCC	0.0028 (0.0159)	0.0024 (0.0159)
Academy	0.0107 (0.0190)	0.0108 (0.0191)
GCT_total	0.0004 (0.0007)	0.0004 (0.0007)
TBS_overall	0.0054*** (0.0018)	
TBS_acad		0.0040** (0.0017)
TBS_lead		0.0011 (0.0012)
TBS_mil		-0.0001 (0.0019)
RSCV	0.0412*** (0.0023)	0.0413*** (0.0023)
ROCV	0.3531*** (0.0175)	0.3562*** (0.0175)
Prior	0.0110 (0.0279)	0.0108 (0.0280)
Years_comm_service	0.0703*** (0.0039)	0.0700*** (0.0040)
Off_Cmbt_Deploy1	0.0509*** (0.0135)	0.0529*** (0.0136)
Off_Cmbt_Deploy2plus	0.0906*** (0.0230)	0.0930*** (0.0231)
EE	0.0160 (0.0120)	0.0178 (0.0121)
High_Fitness	0.0603*** (0.0150)	0.0633*** (0.0151)
Female	0.1525*** (0.0276)	0.1532*** (0.0277)
Non_White	-0.0026 (0.0167)	-0.0023 (0.0167)

Single	-0.0234	-0.0235
	(0.0157)	(0.0157)
Dependents	-0.0013	-0.0009
	(0.0067)	(0.0067)
Current_photo	0.0882***	0.0872***
	(0.0114)	(0.0114)
FY15	0.0319**	0.0317**
	(0.0146)	(0.0146)
FY16	0.1181***	0.1165***
	(0.0162)	(0.0162)
Observations	5,729	5,722
Pseudo_R_Sq	0.366	0.366
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

APPENDIX B. TBS SCORES COMPOSITE MODEL

Table 28. Composite Model with Disaggregated TBS Scores

Variables	Early Career	Job Performance	Experience	Training	Demographics	Board Specific	Year Fixed
MECEP	0.2181***	0.0361*	0.0162	0.0188	0.0122	0.0149	0.0204
	(0.0208)	(0.0200)	(0.0302)	(0.0303)	(0.0301)	(0.0308)	(0.0313)
NROTC	0.0364*	-0.0165	0.0301	0.0265	0.0160	0.0069	-0.0012
	(0.0195)	(0.0185)	(0.0198)	(0.0197)	(0.0193)	(0.0193)	(0.0190)
OCC	0.0984***	0.0341**	0.0126	0.0098	0.0040	-0.0000	0.0024
	(0.0172)	(0.0169)	(0.0159)	(0.0159)	(0.0157)	(0.0159)	(0.0159)
Academy	0.0708***	-0.0006	0.0396**	0.0346*	0.0187	0.0142	0.0108
	(0.0198)	(0.0187)	(0.0196)	(0.0195)	(0.0191)	(0.0193)	(0.0191)
GCT_total	0.0021***	-0.0007	-0.0003	-0.0001	0.0001	0.0002	0.0004
	(0.0006)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
TBS_acad		0.0080***	0.0040**	0.0042**	0.0050***	0.0042**	0.0040**
		(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
TBS_lead		-0.0014	0.0010	0.0002	0.0011	0.0012	0.0011
		(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
TBS_mil		0.0068***	-0.0006	-0.0024	-0.0021	-0.0015	-0.0001
		(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0019)	(0.0019)
RSCV		0.0364***	0.0420***	0.0419***	0.0411***	0.0411***	0.0413***
		(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
ROCV		0.3497***	0.3734***	0.3688***	0.3612***	0.3570***	0.3562***
		(0.0174)	(0.0173)	(0.0173)	(0.0172)	(0.0175)	(0.0175)
Prior			0.0280	0.0327	0.0275	0.0166	0.0108
			(0.0280)	(0.0282)	(0.0282)	(0.0282)	(0.0280)
Years_comm_service			0.0710***	0.0735***	0.0714***	0.0742***	0.0700***
			(0.0037)	(0.0038)	(0.0038)	(0.0040)	(0.0040)
Off_Cmbt_Deploy1			0.0257**	0.0262**	0.0331**	0.0346***	0.0529***
			(0.0129)	(0.0129)	(0.0130)	(0.0132)	(0.0136)
Off_Cmbt_Deploy2plus			0.0424**	0.0427**	0.0491**	0.0553***	0.0930***
			(0.0202)	(0.0202)	(0.0204)	(0.0211)	(0.0231)
EE				0.0264**	0.0308***	0.0269**	0.0178
				(0.0119)	(0.0119)	(0.0121)	(0.0121)
High_Fitness				0.0804***	0.0752***	0.0650***	0.0633***
				(0.0150)	(0.0149)	(0.0151)	(0.0151)
Female					0.1565***	0.1552***	0.1532***
					(0.0269)	(0.0277)	(0.0277)
Non_White					-0.0051	-0.0016	-0.0023
					(0.0163)	(0.0167)	(0.0167)
Single					-0.0350**	-0.0251	-0.0235
					(0.0153)	(0.0157)	(0.0157)
Dependents					-0.0011	-0.0013	-0.0009
					(0.0066)	(0.0067)	(0.0067)

Current_photo						0.0818***	0.0872***
						(0.0115)	(0.0114)
FY15							0.0317**
							(0.0146)
FY16							0.1165***
							(0.0162)
Observations	6,054	5,988	5,988	5,988	5,988	5,722	5,722
Pseudo_R_Sq	0.0189	0.269	0.337	0.342	0.349	0.357	0.366
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1							

APPENDIX C. NORMALIZED FITREP VARIABLES

Table 29. Normalized FITREP Variables

Variables	Basic Model	FITREPs Normalized
MECEP	0.0201 (0.0312)	0.0201 (0.0312)
NROTC	-0.0015 (0.0189)	-0.0015 (0.0189)
OCC	0.0028 (0.0159)	0.0028 (0.0159)
Academy	0.0107 (0.0190)	0.0107 (0.0190)
GCT_total	0.0004 (0.0007)	0.0004 (0.0007)
TBS_overall	0.0054*** (0.0018)	0.0054*** (0.0018)
RSCV	0.0412*** (0.0023)	
NormRSCV		0.1455*** (0.0083)
ROCV	0.3531*** (0.0175)	
NormROCV		0.1775*** (0.0088)
Prior	0.0110 (0.0279)	0.0110 (0.0279)
Years_comm_service	0.0703*** (0.0039)	0.0703*** (0.0039)
Off_Cmbt_Deploy1	0.0509*** (0.0135)	0.0509*** (0.0135)
Off_Cmbt_Deploy2plus	0.0906*** (0.0230)	0.0906*** (0.0230)
EE	0.0160 (0.0120)	0.0160 (0.0120)
High_Fitness	0.0603*** (0.0150)	0.0603*** (0.0150)
Female	0.1525*** (0.0276)	0.1525*** (0.0276)
Non_White	-0.0026 (0.0167)	-0.0026 (0.0167)
Single	-0.0234 (0.0157)	-0.0234 (0.0157)

Dependents	-0.0013 (0.0067)	-0.0013 (0.0067)
Current_photo	0.0882*** (0.0114)	0.0882*** (0.0114)
FY15	0.0319** (0.0146)	0.0319** (0.0146)
FY16	0.1181*** (0.0162)	0.1181*** (0.0162)
Observations	5,729	5,729
Pseudo_R_Sq	0.366	0.366
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

LIST OF REFERENCES

Amos, J. F. (2010). 35th commandant of the Marine Corps commandant's planning guidance. Retrieved from United States Marine Corps website: http://www.marforeur.marines.mil/Welcome-Aboard/

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis with special reference to education* (3rd ed.). Chicago, IL: The University of Chicago Press.

Bowling, K., Stimpson, D., & Hiatt, C. (2008). *The effect of Naval Postgraduate School (NPS) on the promotion of Marine Corps officers*. Alexandria, VA: Center for Naval Analyses.

Cancian, M. F., & Klein, M. W. (2015). *Military officer quality in the all-volunteer force* (NBER Working Paper No. 21372). Retrieved from the National Bureau of Economic Research website: http://www.nber.org/papers

Clelan, E., Kao, T., & Ladner, J. (2016). *Strengthening the Marine Corps 88XX analyst community.* Arlington, VA: Center for Naval Analyses. Retrieved from https://www.cna.org/research/

Department of Defense. (2014). *2014 demographics: Profile of the military community*. Office of the Deputy Assistant Secretary of Defense (Military Community and Family Policy). Retrieved from Military OneSource website: http://www.militaryonesource.mil

Garza, R. P. (2014). *United States Marine Corps career designation board: Significant factors in predicting selection* (Master's thesis). Retrieved from Calhoun http://hdl.handle.net/10945/41381

Griner, M. S. (2016). *Quality of USMC officers: Buildup vs. reduction in forces* (Master's thesis). Retrieved from Calhoun http://hdl.handle.net/10945/48529

Johnson, J. A. (2015). *Significant pre-accession factors predicting success or failure during a Marine Corps officer's initial service obligation* (Master's thesis). Retrieved from Calhoun http://hdl.handle.net/10945/47970

Kane, T. (2012). *Bleeding talent: How the U.S. military mismanages great leaders and why it's time for a revolution.* New York, NY: Palgrave Macmillan.

McHugh, C. M., Potter, H. A., Stimpson, D., Moskowitz, M. J., Quester, A. O., Samuelson, D. L., & MacLeod, I. D. (2006). *Analyses of the Marine Corps officer manpower system: Final report*. Alexandria, VA: Center for Naval Analyses.

Neller, R. B. (2017) 2017 CMC institutional-level task list for deputy commandants (DCs) and commanders. Retrieved from United States Marine Corps website: http://www.marines.mil/News/Publications/

Rosen, S. (1992). The military as an internal labor market: Some allocation, productivity, and incentive problems. *Social Science Quarterly, 73,* 227–237. Retrieved from http://connection.ebscohost.com/

Scarfe, J. C. (2011). *An analysis of departure behaviors of high-quality career designated first-term Marine officers* (Master's thesis). Retrieved from Calhoun http://hdl.handle.net/10945/48590

Shaw, J. (n.d.). Characteristics of a high performance employee. *Houston Chronicle.* Retrieved from http://smallbusiness.chron.com

Sundheim, K. (2013, April 2). 15 traits of the ideal employee. *Forbes*. Retrieved from http://www.forbes.com

United States Marine Corps (2006). *FY07 supplemental special education program (SSEP) and advance degree program (ADP) selection board* (Marine Administrative Message 516/06). Retrieved from http://www.marines.mil/News/Messages/Messages-Display/Article/894792/fy07-supplemental-special-education-program-ssep-and-advance-degree-program-adp/

United States Marine Corps (2010). *Performance evaluation system* (Marine Corps Order P1610.7F Ch. 2). Retrieved from http://www.marines.mil/News/Publications/Electronic-Library/

United States Marine Corps (2012a). *Fiscal year (FY) 13 Commandant's career-level education board (CCLEB) selection board results* (Marine Administrative Message 566/12) Retrieved from http://www.marines.mil/News/Messages/Messages-Display/Article/895041/fiscal-year-fy-13-commandants-career-level-education-board-ccleb-selection-boar/

United States Marine Corps (2012b). *Implementation of Commandant's planning guidance task to increase officer PME* (Marine Administrative Message 254/12). Retrieved from http://www.marines.mil/News/Messages/Messages-Display/Article/887511/implementation-of-commandants-planning-guidance-task-to-increase-officer-pme/

United States Marine Corps (2013). *Precept convening the FY14 Commandant's career-level education board (CCLEB).* Retrieved from https://www.manpower.usmc.mil

United States Marine Corps (2014). *Membership requirements for selection boards convening between July 2014 through September 2015* (Marine Corps Bulletin 5420). Retrieved from https://www.manpower.usmc.mil/

United States Marine Corps (2015). *FY16 Commandant's career-level education board* (Marine Administrative Message 310/15) Retrieved from http://www.marines.mil/News/Messages/Messages-Display/Article/897253/fy16-commandants-career-level-education-board/

USMC Fitness Report (NAVMC 10835, Rev.7-11) Retrieved from: Department of the Navy website: https://navalforms.documentservices.dla.mil

Wilhelm, C. E., Gregson, W. C., Knutson, B. B., Van Riper, P. K., Krepinevich, A. F., & Murry, W. (2006). *U. S. Marine Corps officer professional military education 2006 study and findings.* Quantico, VA: Marine Corps University.

Wiler, D., & Hurndon, N. (2008). *An analysis of performance at the basic school as a predictor of officer performance in the operating forces* (Master's thesis). Retrieved from Calhoun http://hdl.handle.net/10945/4223

Wooldridge, J. M. (2009). *Introductory to econometrics: A modern approach* (4th ed.). Mason, OH: South-Western Cengage Learning.

Wright, W. G., Thompson, A. C., & Blake, L. E. (2002). *Critical secondary military occupational specialty (MOS) study final report.* Quantico, VA: Marine Corps Combat Development Command.

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